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SPECIAL ISSUE

Electronic COMMERCE

How to Sell in the Future

Will the Internet Kill EDI?

Meet the EC Pioneers

BEGINNING ON PAGE 42

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Inside CIO

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The challenges of transacting business on a network have historic foundations. But thanks to ubiquitous, split-second access, the scope and pace of commerce will never be the same.

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If legacy EDI software is integrated with the Web and VANs are offered by Internet service providers, variations on EDI will keep revitalizing this important EC tool.

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By Derek Slater

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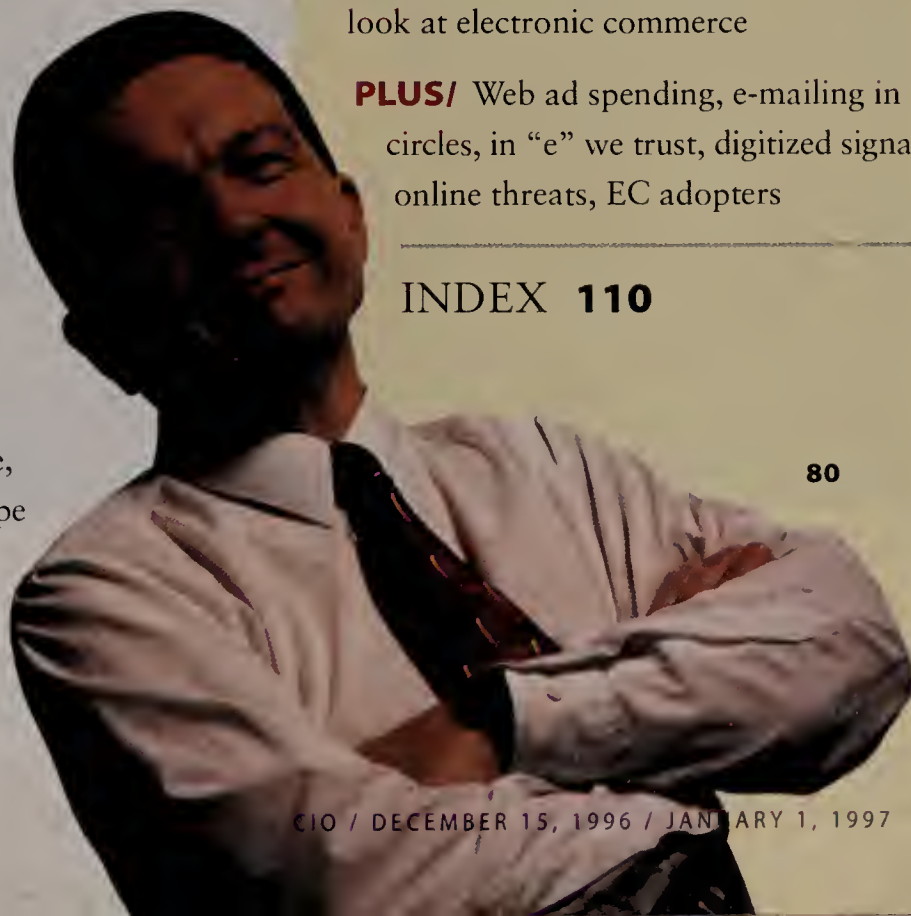
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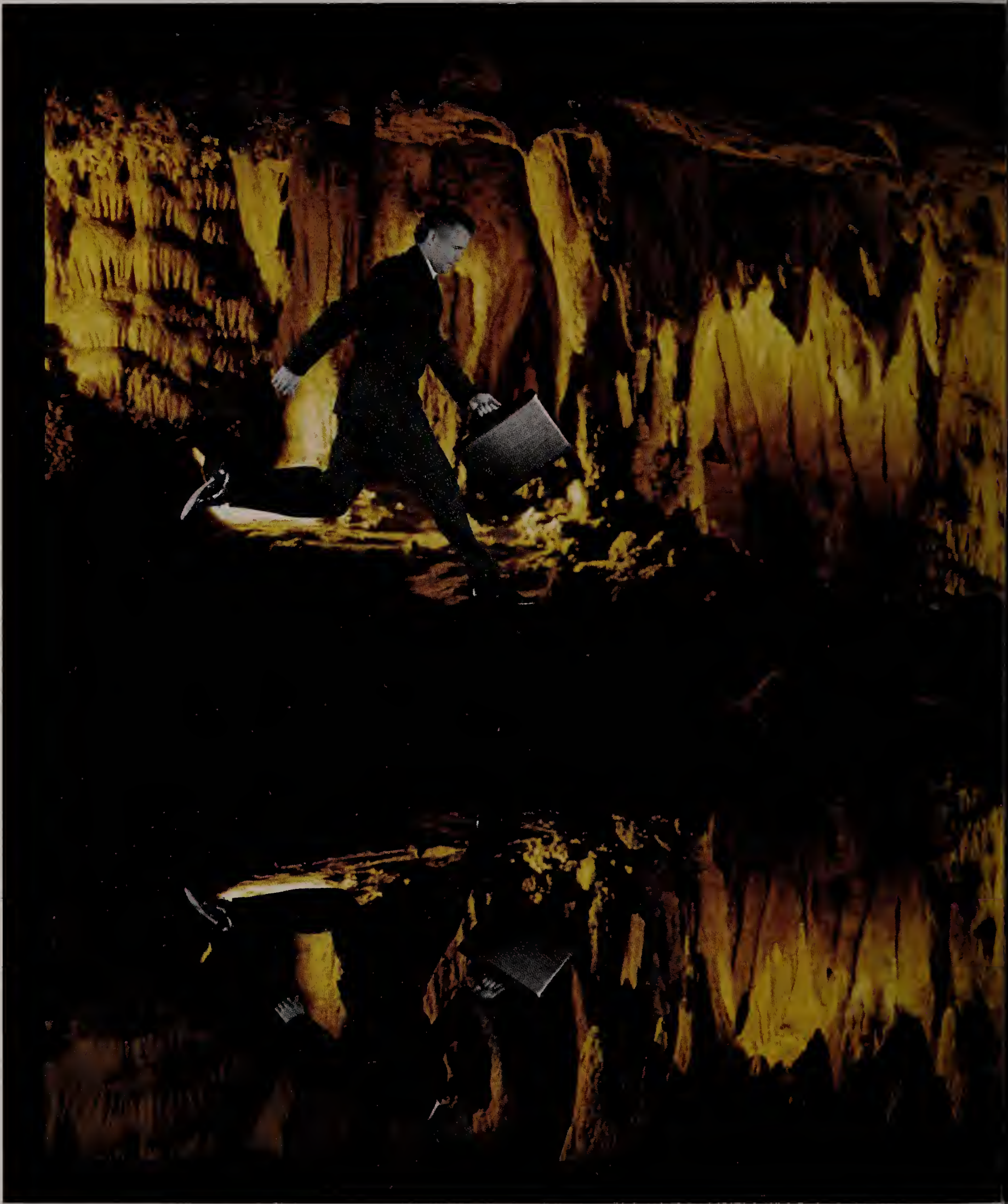
PLUS/ Web ad spending, e-mailing in circles, in "e" we trust, digitized signatures, online threats, EC adopters



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Geoffrey Moore's technology adoption framework can help CIOs plan for the wired markets of the future. *By Carol Hildebrand*



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New On Our Web Site

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LEARN MORE ABOUT ELECTRONIC COMMERCE

This special issue of *CIO* is just the tip of the EC iceberg. From Jan. 13-27, we will host our newest **Online Feature Forum**, "Electronic Commerce: Should You? Would You?" Exchange questions, answers and opinions with *CIO* writers, editors and readers as well as industry experts. www.cio.com/forums/ec.html

Resource Center Visit to find additional articles, white papers, vendor lists and information about security and marketing on the Web. www.cio.com/CIO/rc_ec.html

STILL TALKING

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(www.cio.com/forums/year2k.html)
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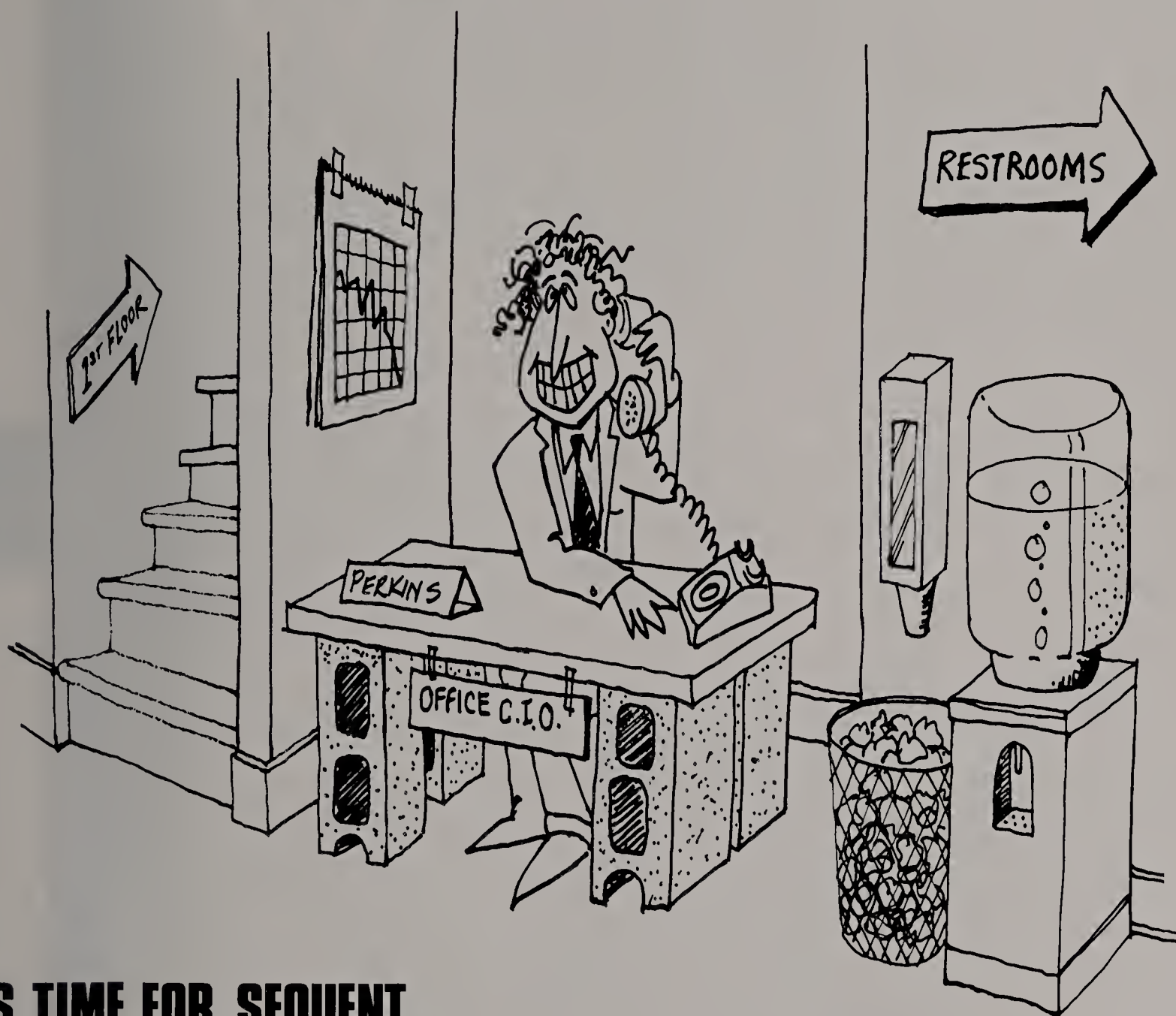
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The *CIO* Archive Search our collection of *CIO* feature articles dating from September 1994. www.cio.com/ciomag/archive/cio_index.html



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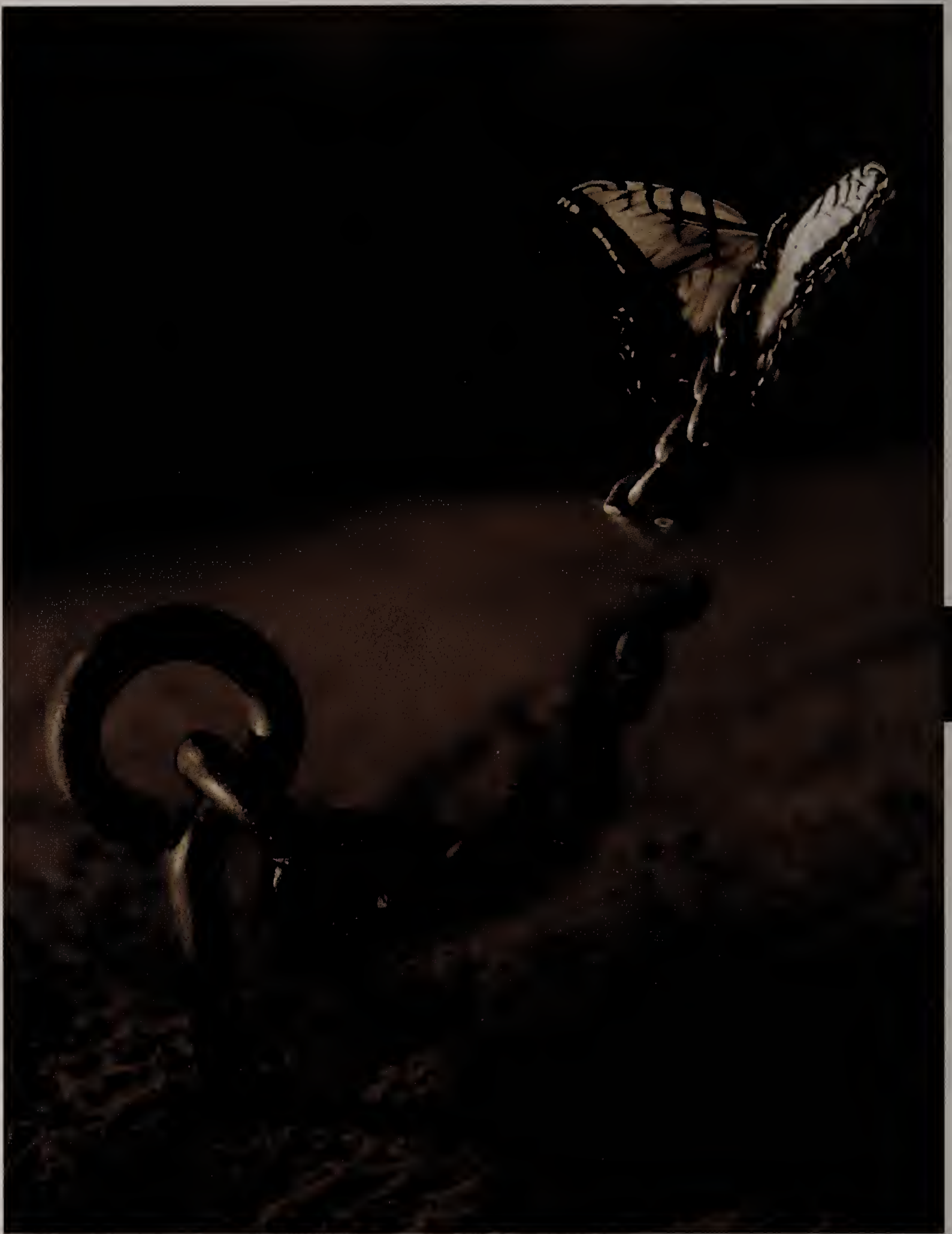
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In Box

LETTER FROM THE EDITOR, READER FEEDBACK AND HOW TO REACH US

Regardless of what business you're in, it's a mistake to think of electronic commerce just in terms of the purchase transaction. "Anything that tightens your relationship with an existing customer increases the revenue you get from that customer," says Michael Taylor of Arthur D. Little in "The Electric Handshake," by Staff Writer Heath Row, beginning on Page 48. That includes online mar-

keting, electronic catalogues linked to back-end databases, product configuration by customers over the Web, the manipulation of customer data to enable cross-selling, real-time service and support, and on and on.

The Internet makes all of that possible. Unlike traditional EDI, Internet commerce enables companies to coordinate all aspects of the customer relationship, causing some people to write EDI's obituary. "EDI is dead in 24 months," says William Schrader, CEO of PSINet. Others are not so quick to dismiss it, pointing out that vendors are finding new ways to wed EDI and the Internet. That reminds me of the Notes versus the Web debate that was raging early last year. As was predicted would happen with Notes, EDI will evolve into something more flexible, versatile and universally accessible than its traditional incarnation and will be more secure and reliable than the Internet in its raw form. (See "The Once and Future EDI," by Con-

tributing Writer Lynda Radosevich, Page 66.)

But is EC really a mainstream concern, or is it just something to keep consultants and gurus occupied? David Drew, staff vice president for IT at 3M, has made EC one of his top three priorities (see "Sticking with Strategy," by Staff Writer Derek Slater, Page 80). In order to streamline the supply chain and simplify the buying process, the company is expanding its EDI capabilities, creating electronic catalogs, employing one-to-one database marketing, exploring Web-based direct selling and enhancing customer service.

Consultant and author Geoffrey Moore says electronic commerce is evolving at a natural pace. "Open EDI is not going to come in a big rush next year. But it will come in a gradual [and] comfortable way," Moore says, in an interview with Senior Writer Carol Hildebrand on Page 92. "The key for CIOs is to commit to the correct level of electronic commerce every year and not push beyond the envelope that current infrastructure and practitioners can support."

Let us know about your EC initiatives. Write to us at letters@cio.com or join our online forum on the topic at www.cio.com/forums/ec.html, running Jan. 13-27.

Special thanks to Associate Editor Perry Glasser for bringing this issue together and to Senior Graphic Designer Linda Golon for her stunning and original design work.


lundberg@cio.com

FROM OUR READERS

JOBS OF DREAMS

The Executive Counsel column by Cheryl Dahle in the Oct. 15, 1996 issue ["The Stuff Dream Jobs Are Made Of"], was an excellent case study of Progressive Insurance's leadership in developing long-term relationships with its people. It outlined well an approach I hope more companies will take so we can once again build longer-term loyalty in the workforce. Congratulations to Progressive's management for recognizing true leadership.

At my company, we are still struggling with the issues of casual dress, flex-time, incentives and flex-benefits. While I believe we offer employees good compensation and benefits, we do not customize benefits to meet the needs of indi-

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viduals and maximize return on our most valuable resources. We are just beginning to empower the department heads to make variations; this has previously been suppressed for fear of being unfair.

But fairness does not mean sameness. The only thing I think your article may have lacked was addressing this fairness concern. Some of the positions we have, especially operational or support positions, require that people be available at specific times, for instance. In a small company like ours, those people work side by side with people whose jobs do not have the same requirements. When the benefits for two employees are different, how do you maintain a sense of fairness?

The fear of being unfair causes more-conservative executives to avoid the issue of flexible employment policies entirely, and the company continues to maintain its revolving door.

Right now, I am working to encourage policy changes in dress code, flex-time and work-at-home opportunities. Those are the issues my people and employment candidates ask for frequently. And for employees and applicants whose spouses already have benefits, I am trying to encourage implementing benefit credits that could be used to purchase more vacation/holiday time or merchandise (since we are a retailer). We'll see.

Richard Oppenheimer
Information Services Manager

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Thank you for writing such an informative and provocative article. I'm sure every IS person in every company thinks about [employee satisfaction] daily. Top management likes to sweep the issue under the carpet and chalk it up to "young people just

being greedy." But, as you point out, there is a lot more to the story. Young people and those who have been around for a while just want a company to care about its employees. Something as simple as free soft drinks can make a world of difference. Morale is a key business factor.

Tom Johnston
Webmaster & Technical Analyst
Chemical Leaman Tank Lines
Exton, Pa.

In the sidebar "Hire Power" accompanying "The Stuff Dream Jobs Are Made Of," you offer a series of suggestions from Philip Anderson, an associate professor at Dartmouth College's Amos Tuck School of Business Administration, and Jim Gordon, HR manager of Progressive Insurance Co.'s claims division, for hiring IS staff. Those suggestions include the following "tips":

- 1) "Hire former consultants who are 'vaccinated' against the lure of big money and a fast life."
- 2) "Avoid hiring IS employees whose resumes look like AAA maps."

As a consultant (or "contract") programmer, this made me smile; leaving aside the choice of "vaccinated" as a word to describe a consultant's condition (why not "accustomed to" instead of "vaccinated against"?), I am wondering...don't most consultants get their sought-after expertise from having dealt with many different clients under many different situations and earning "resumes [that] look like AAA maps"?

Leonard Silberstein
Ellicott City, Md.

Interesting observation. However, while consultants usually work for a series of clients, they don't necessarily move from employer to employer, which I believe is what that particular caveat refers to.



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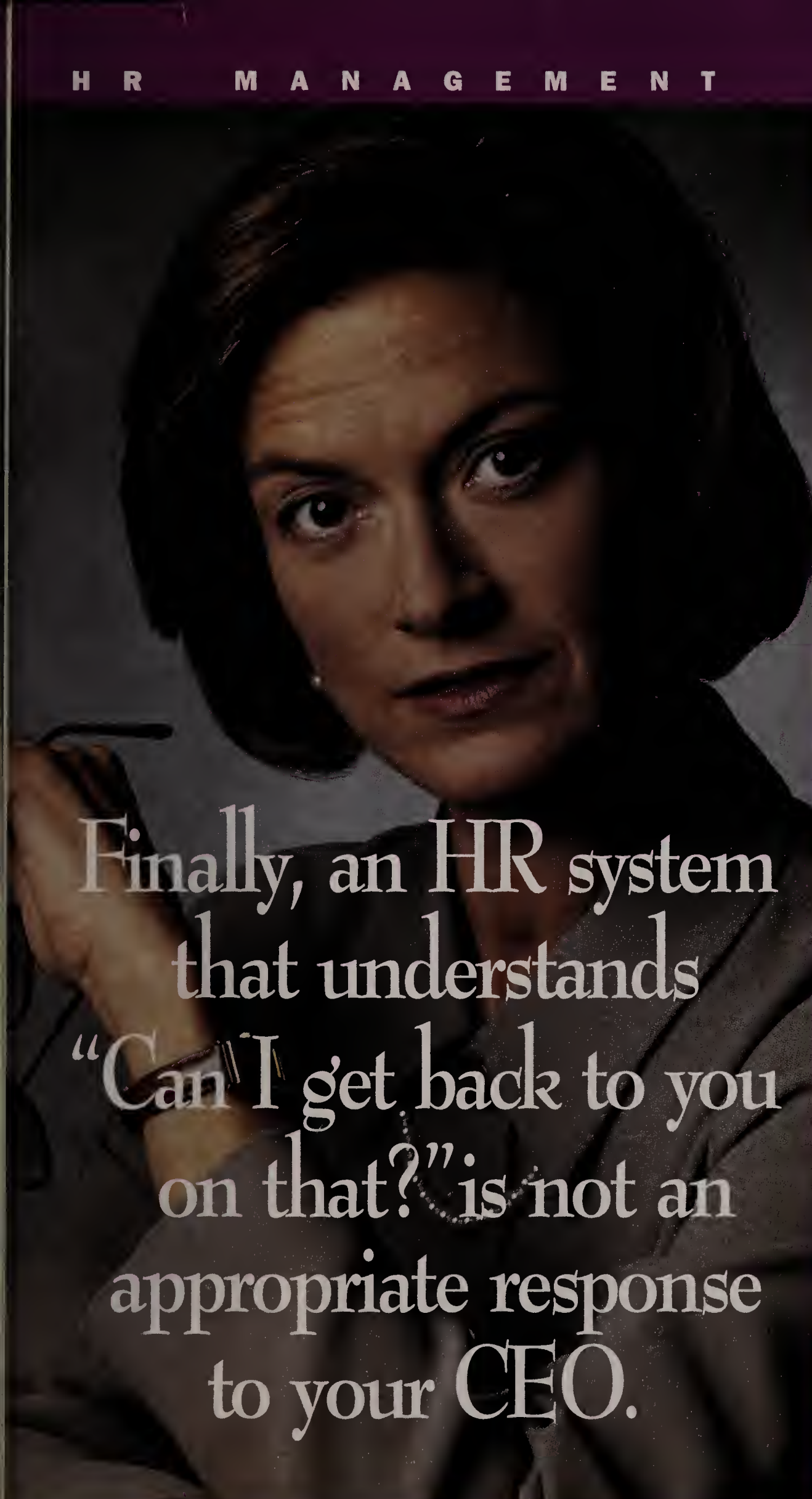
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The Retreat will be facilitated by F. Warren McFarlan, Senior Associate Dean, Director of External Relations and Ross Graham Walker Professor of Business Administration, Harvard Business School. He will lead participants through the increasingly difficult path of IT acquisitions, with innovative discussions on outsourcing, the CIO as in-house systems integrator and risk and investment management.

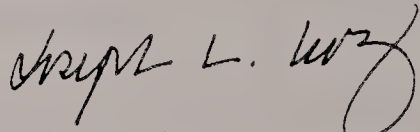
You will participate in a case study with the CIO and CEO of a \$2 billion power cable manufacturing corporation, led by Professor McFarlan. And, John J. Sviokla, Associate Professor of Business Administration, Harvard Business School, will lead a case study on the virtual value chain and the transition from marketplace to marketspace.

Participants are invited to attend the **Enterprise Value Awards Ceremony and Dinner** on Tuesday evening. Proudly underwritten by AT&T Solutions, the ceremony and dinner will honor recipients for their achievements in demonstrating enterprisewide Information Technology benefits.

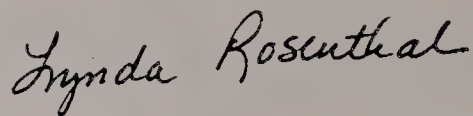
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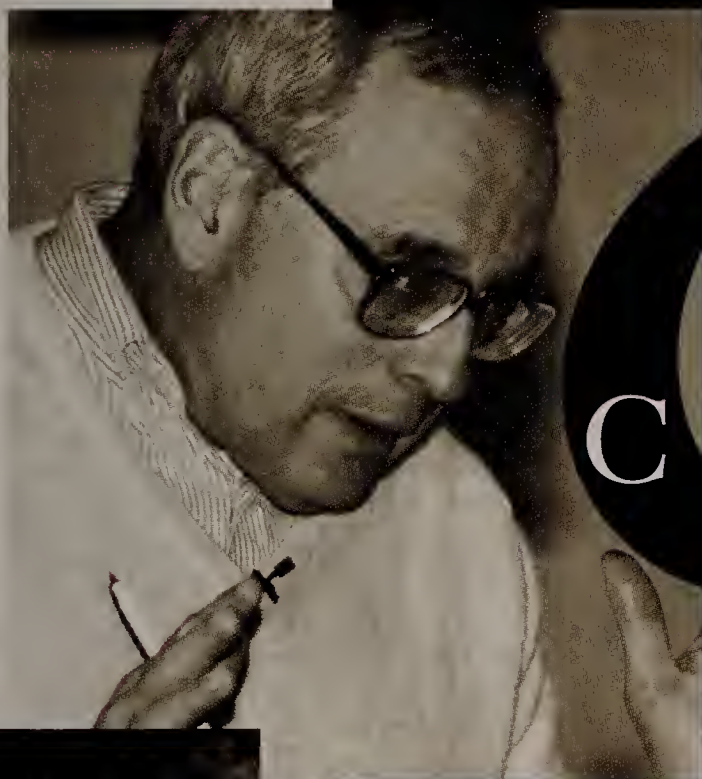
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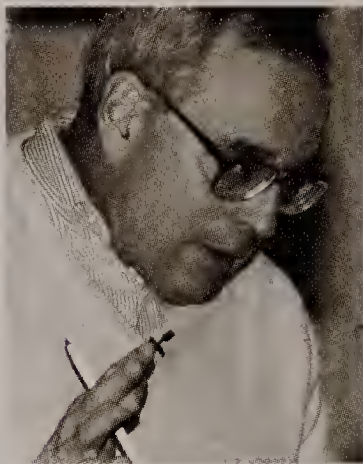
As a Retreat participant, you are invited to be our guest at CIO's Enterprise Value Awards ceremony and dinner to be held Tuesday evening, February 4. The Award recipients are being honored for their achievements in demonstrating ROI from Information Technology.

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Enterprise Value Awards



"We are in the midst of a technology discontinuity which is profoundly impacting channels of distribution, market structures, organization of work and service standards. Good management is at the core of success."

— F. Warren McFarlan
Senior Associate Dean
Director of External Relations
Ross Graham Walker
Professor of Business Administration
Harvard Business School



ou will take part in a real-life case study facilitated by F. Warren McFarlan, Senior Associate Dean, Director of External Relations and Ross Graham Walker Professor of Business Administration, Harvard Business School, designed to lead participants through the often tangled path of Information Technology acquisitions. From conception to implementation, you will learn how to justify costs, budget more effectively, sell ideas to internal management and users and gain a better understanding of the enterprisewide strategic implications of your decisions.

SUNDAY, FEBRUARY 2

8:00AM-10:30AM	Registration and Breakfast
12:30PM	Golf Tournament at Monarch Beach Golf Links
3:00PM-6:30PM	Registration
6:30-7:00PM	Retreat Introduction F. Warren McFarlan Senior Associate Dean Director of External Relations Ross Graham Walker Professor of Business Administration Harvard Business School Join Retreat participants in an event synopsis
7:00PM-10:00PM	Partner's Cafe Meet other participants and Retreat Partners

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MONDAY, FEBRUARY 3

- 7:30AM-8:15AM Breakfast
 8:15AM-8:30AM Welcome and Opening Remarks
Joseph L. Levy
*Group Publisher & President
 CIO Communications, Inc.*
 8:30AM-10:00AM Managing in the Marketspace
John J. Sviokla
*Assistant Professor of Business
 Administration
 Harvard Business School
 Implications for the CIO of shifting
 from marketplace to marketspace*
 10:00AM-10:30AM Mid-Morning Break
 10:30AM-11:15AM Exploiting the Virtual Value Chain
John J. Sviokla
*Showing how to extract value in
 "place" and in "space"*
 11:15AM-12:00PM Cybersmith Case Study
John J. Sviokla
*Examine this tech-retail-store-cafe
 entrepreneurial Web venture*
 12:00PM-1:30PM Luncheon
 1:30PM-2:30PM Concurrent Sessions
*Choose among several sessions
 offered by our Partners*
 2:45PM-3:45PM Concurrent Sessions—Repeated
 4:00PM-5:00PM Summation of day's case study and
 preview of Tuesday's case study
 6:30PM-7:30PM Partners' Cafe
*Meet other participants and Retreat
 Partners*
 7:30PM Dine Around or Captain's Table

TUESDAY, FEBRUARY 4

- 7:30AM-8:15AM Breakfast
 8:15AM-10:00AM Business Process Redesign and the
 Role of Intranets
F. Warren McFarlan
*Changes in infrastructure being facili-
 tated by today's new technologies*
 10:00AM-10:30AM Mid-Morning Break
 10:30AM-12:00PM Enterprise Value Case Study:
 Southwire Corporation
F. Warren McFarlan
*View, in depth, this privately-held \$2
 billion power cable manufacturing
 company*

- 12:00PM-1:30PM Luncheon
 1:30PM - 3:45PM Case Study Workgroups
*Break into small groups to develop
 the case*
 4:00PM-5:00PM New Ways of Assessing IT Services
F. Warren McFarlan
*New reflections on the make/buy
 decision*
 6:30PM-7:15PM Enterprise Value Awards Reception
Meet the Award winners and judges
 7:15PM Enterprise Value Awards Ceremony
 and Dinner
*Join CIO and AT&T Solutions in
 recognizing the winners of the
 Enterprise Value Awards*

WEDNESDAY, FEBRUARY 5

- 7:30AM-8:15AM Breakfast
 8:15AM-9:15AM Case Study: Roundtable Presentations
 and Discussion
F. Warren McFarlan
Examine breakout solutions
 9:15AM-10:00AM Case Study: Epilogue and Reflections
F. Warren McFarlan
Roy Richards, Jr.
*Chairman and CEO
 Southwire Corporation*
Lee Hunter
*Vice President
 Environmental & Technical Support
 Southwire Corporation
 Review case decisions with
 company executives*
 10:00AM-10:30AM Mid-Morning Break
 10:30AM-11:45AM Delivering IT Results in the
 Information Mediated Age
F. Warren McFarlan
*Techniques and processes for
 ensuring attractive bottom line results*
 11:45AM-12:00PM Summary
F. Warren McFarlan

Reservation Form on Back Page

E N T E R P R I S E
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R E T R E A T

February 2-5, 1997
Ritz-Carlton Laguna Niguel
Dana Point, California

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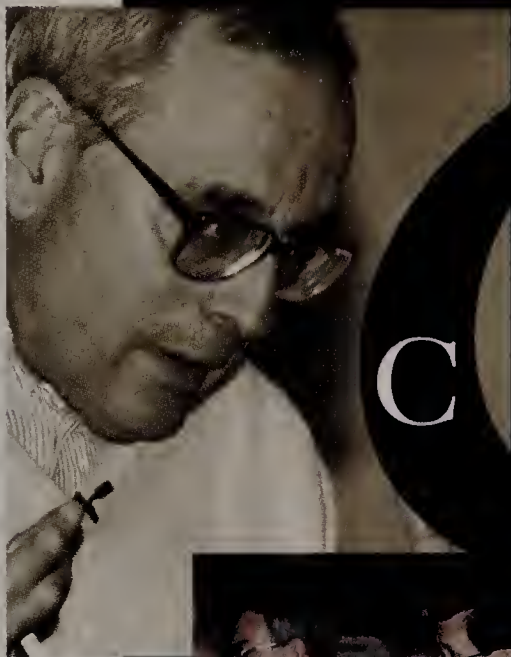
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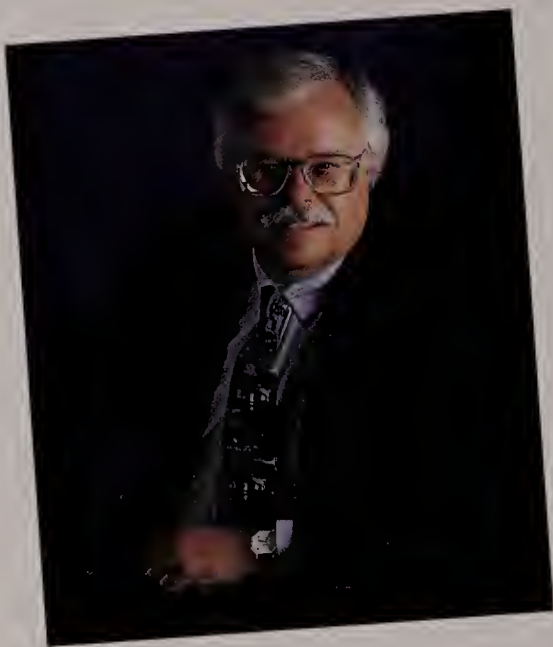


Publisher's Note

"Most people in a company don't realize what technology can do for them. The CIO can be the conduit and the link between what is possible and what is done."

*—Gordon Brooks, Senior Vice President
Cambridge Technology Partners*

Never underestimate your power in the organization. You are like Mr. Spock on the Starship Enterprise. Captain Kirk, your CEO, may call the shots, but where would he be without his second-in-command? Probably acquired by the Klingons.



Technology is the ammunition that keeps companies competitive. Used wisely (and logically), it can warp you into the next millennium. We have dedicated this issue to one technological weapon that may do just that—electronic commerce (EC). And there's a lot to cover. "EC is much more than buying and selling," says Rick Watson, an associate professor of MIS at the University of Georgia in Athens. "It's about retaining legitimacy and operating in the long run. It's providing an ongoing service for customers." From EDI

to voice response systems, smart cards to Web-based transactions, EC is about building relationships with customers and business partners to ensure your company's success.

Yet with only 112 pages in this issue, how can we do EC justice? Beginning Jan. 13, *CIO* and *WebMaster* magazines will host our newest Online Feature Forum, "Electronic Commerce: Should You? Would You? How?" You can find it at www.cio.com/forums/ec.html. The forum will be bolstered by our Electronic Commerce Resource Center—a source of additional related information and links (www.cio.com/CIO/rc_ec.html).

Implementing EC takes more than the right technology. It also requires cultural and behavioral change, and that makes your task more challenging. With this issue of *CIO*, the EC Online Feature Forum and the EC Resource Center, we hope to give you the knowledge to boldly take your company where no company has gone before.

A handwritten signature in dark ink, reading "Joseph L. Levy".

P.S. The CIO Enterprise Value Retreat has expanded its format, giving you an extra day to hear from industry experts on IT value metrics and network with peer CIOs. The 1997 Enterprise Value Retreat will be held Feb. 2-5 at the Ritz-Carlton Laguna Niguel in Dana Point, Calif. Call 800 355-0246 to register for this annual event, or visit our Web site at www.cio.com/conferences/enterprise.html.

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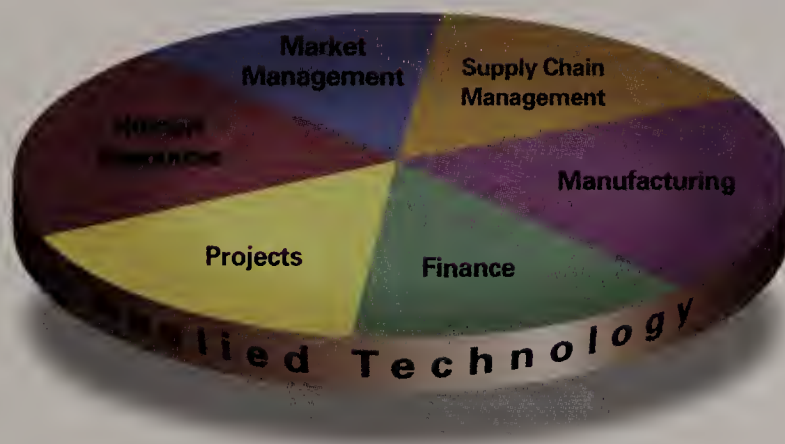
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THE NETWORK IS THE COMPUTER™

Trendlines

NEWS, INSIGHT, HUMOR, REVIEWS

Edited by Alice Dragoon

Friends, Surfers, Customers, Sell Me Your Ears

PAYING ATTENTION Marketers have long salivated at the prospect of delivering targeted messages over the Internet. But just getting the right message to the right person isn't enough. If the message is viewed as junk e-mail or your Web banner ad is ignored, all is for naught. To be sure they're getting consumers' attention, some advertisers are starting to pay would-be customers for reading online ads.

"In modern society, attention is a scarce commodity, and consumers should get paid for providing it," says Nat Goldhaber, founder and CEO of CyberGold Inc., a startup marketing and advertising firm in Berkeley, Calif. Goldhaber's company, which counts among its board members advertising guru Jay Chiat, offers a Web-based service that lets registered members self-select ads for the products and services that are most interesting to them.

The CyberGold service, which is scheduled to go live in early 1997, will

require customers to log in at the CyberGold site, where they'll see a customized page of ads. When members click on ads—and prove that they've read them by answering questions about the products—CyberGold "coins" are deposited in their accounts, which they can use to buy products and services online. CyberGold will be free, but members must fill out a user profile listing their preferences. For their part, advertisers commit to a fixed advertising budget that buys a predetermined number of impressions or exposures to the ad. Advertisers that pay a premium will be

able to target ads to fit specific consumer preferences. Another new service based on the "pay-for-attention" model is Millennium Mailbox from Millennium

Interactive Technologies Corp. in Middletown, N.J. The company hopes to sign up 1 million alpha testers to read "ad-mail" in return for digital cash.

"People who sign on don't have to give us information about themselves,



Here We Go Loop-De-Loo

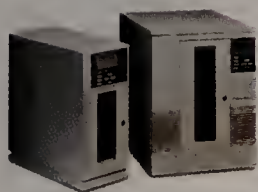
IMPENDING DISASTERS For those seeking evidence to substantiate predictions that the Internet will collapse under its own weight, here's exhibit A: Bellmore, N.Y.-based Internet consultant Wayne Spivak recently found himself caught in the middle of an auto responder loop from hell. Someone visited his Web site, a guide to computer vendors, and sent e-mail to his auto responder using a return address that was also an auto responder. Not surprisingly, chaos ensued. About

10,000 messages later, Spivak called the unwitting perpetrator's Internet service provider to request that his server be taken offline, thereby stemming the tide of e-mail.

Until the next batch of e-mail server software

comes along with code to prevent such loopiness, Spivak is taking no risks. His Web site's home page is now emblazoned with this bright-red message to visitors: "Do Not Use an Auto Responder as Your E-Mail Address!! It Will Cause a Server-to-Server Loop!!!!" ■





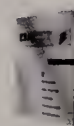
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Trendlines

although it's a lot more useful if they do," explains David Helmstetter, Millennium's CEO and president. The company compiles a list of subscriber e-mail addresses and then lets advertisers bid on sending ad-mail messages. In turn, subscribers bargain with advertisers for their compensation. For example, an advertiser with a \$10,000 budget can reach 40,000 people who agree to receive 25 cents for reading the ad. But if subscribers demand 50 cents, the ad will go to just 20,000 people.

Both CyberGold and Millennium say they will not provide detailed user information to advertisers without users' permission. And both services require members to interact with advertising messages in some way to guarantee that they are actually reading the ads. The companies contend that they're on to something big. "As time becomes much more precious," Helmstetter says, "companies will be willing to pay consumers for their undivided attention."

—Megan Santosus

In 1886, Richard Sears invented electronic marketing by selling pocket watches via telegraph. Soon after that, he met a fellow named Roebuck. The rest, as they say, is history.

Here's the Pitch

WEB AD REVENUES Advertisers spent \$138 million on the Web in the first three quarters of 1996, according to New York-based Jupiter Communications' AdSpend data. Third-quarter revenues totaled \$66 million, a 43 percent increase over second-quarter figures. Microsoft Corp. was the biggest spender, shelling out \$2.9 million for Web ads in Q3. Netscape Communications Corp. led all Web sites in third-quarter ad revenues, collecting \$8.2 million; the top 10 Web sites took in 64 percent of all ad revenues. Although high-tech ads continue to dominate cyberspace, noncomputer-related consumer product advertisers accounted for 13 percent of Q3 ad spending. Jupiter predicts that advertising revenues will reach \$5 billion a year by 2000. ■

Patent Disregard

E.C. LITIGATION These days, surfers who try to visit the old Dial-A-Gift Web site to order flowers, balloons and gift baskets are greeted with a "Server Not Found" message. The flowers at the site that once served as the electronic catalog for E-data Corp.'s phone-based gift ordering service have been left to wilt while the site's proprietors wage court battles that could determine the rate—and fate—of electronic commerce (EC) on the Net.

Since fall 1995, Secaucus, N.J.-based E-data (www.3wnet.com/corpledata/), which holds a 1985 patent for a system that reproduces "information in material objects at a point-of-sale location," has filed three civil suits in Connecticut and New York against more than 40 companies, including CompuServe Inc., Dun & Bradstreet Inc., First Virtual Holdings Inc., Intuit Inc. and Ziff-Davis Publishing

Co. Claiming that the companies' EC activities and on-demand electronic distribution systems infringe on E-data's patent, the three-person company wants to collect licensing fees from almost everyone distributing digital data on the Internet, floppy disks or encrypted CD-ROMs.

The company contacted about 75,000 businesses informing them of the patent, legal actions and a licensing opportunity. So far, some 20 companies—including Adobe Systems Inc., VocalTec Inc., and IBM Corp.—have signed a limited license agreement with E-data that allows content providers, resellers and service providers of electronic distribution applications to participate in electronic commerce for a fee, ranging from 1 to 5 percent of annual net revenues.

Arnold Freilich, president of E-data, says the company is not out to squelch EC or to blackmail anyone but merely wants to defend its patent. "We never claimed to have a patent for software distribution and electronic distribution; we claimed to have a patent for an automated system that makes it happen," says Freilich. "If we don't defend it, we lose it."

But at least one defendant is claiming that the E-data patent should not have been issued and is based on technology already in use before the patent was filed. And Carl Oppedahl, counsel for Softlock Services Inc., a defendant in the New York case, says that if the patent's scope is as broad as Freilich and E-data claim, and if the company sets a steep license fee, the patent could slow the growth of EC. "Softlock feels that the claims will turn out



ILLUSTRATION BY JAMES O'BRIEN

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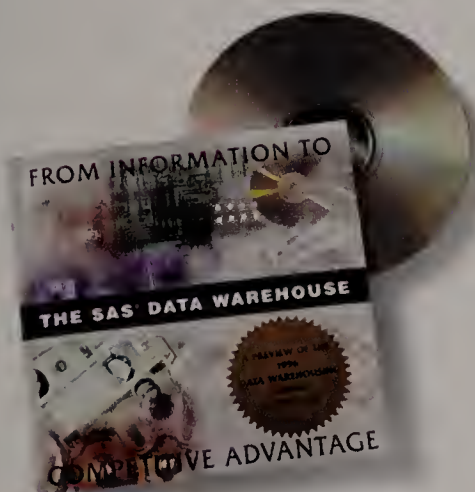
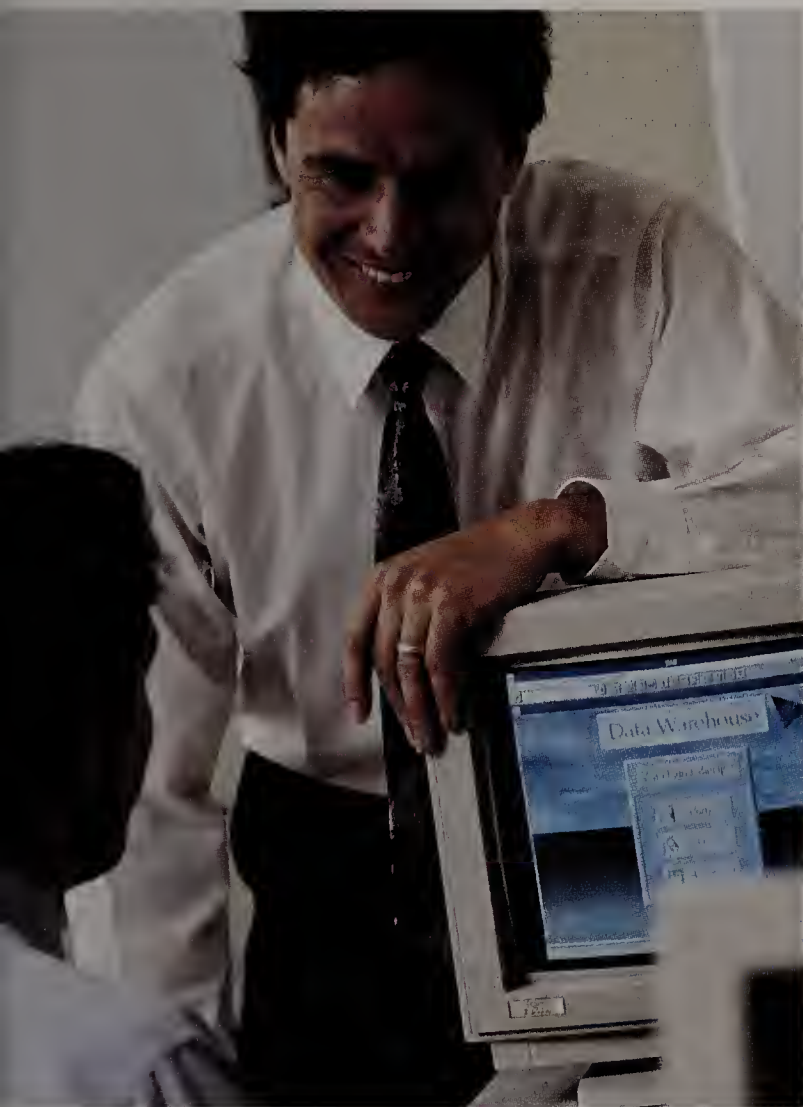
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Trendlines

to be narrower in scope than the patent owner thinks, but if it actually turns out to be of a scope such as the patent holder is suggesting, the patent holder could be richer than Bill Gates," says Oppedahl, a partner in the Yorktown Heights, N.Y.-based firm Oppedahl & Larson. Softlock, of Rochester, N.Y., develops program routines used to unlock demo software upon payment so that users can access all of the software's functions.

One of the Connecticut cases was dismissed without prejudice, and the two remaining cases are expected to continue into early 1997. For now, most of those contacted by E-data are awaiting the results of the litigation, and business is on hold at Dial-A-Gift. "We're focusing on the patent," Freilich says.

—Heath Row

In 1845, the American Morse Telegraph Co. charged a penny to transmit four characters. In June of that year, its revenues totaled \$21.23, and by October the business had grown to \$413. Twenty-eight years later, Western Union had assets of \$40 million.

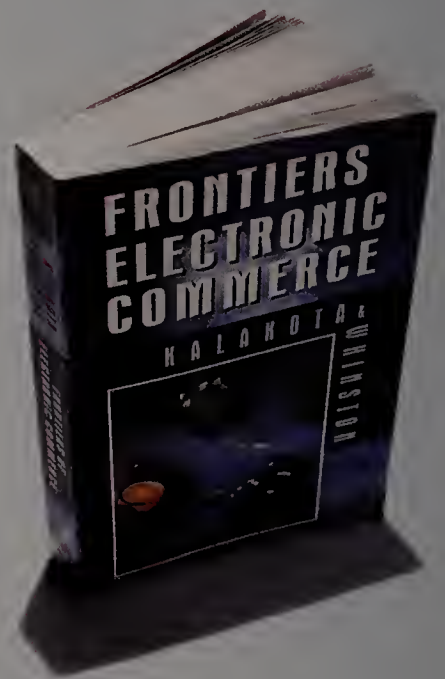
Correction:

In our Nov. 15, 1996, issue we incorrectly reported the number of employees at KPMG Peat Marwick LLP. The company has 500 IS staff members and more than 76,000 employees.

Off the Shelf

Electronic Commerce Roundup

IF YOU HAVE ROOM FOR only one book about electronic commerce on your shelf, you need a larger shelf. But if you insist on reading only one, it ought to be **Frontiers of Electronic Commerce** by Ravi Kalakota and Andrew B. Winston (Addison-Wesley, 1996). The 22 chapters of this comprehensive 850-page overview provide a range of information appropriate for everyone from the manager who needs to understand a concept to the technician who is happiest with a discussion of feeds and leads. Without ever losing sight of the business case, Kalakota and Winston make plain how various encryption strategies mesh with different payments schemes, how interorganizational commerce and EDI differ from intraorganizational EC, the purposes of a corporate digital library and how the business case affects document infrastructure, as well as how the Web is transforming marketing, sales and on-demand education. Clear charts and illustrations, a thorough index and an exhaustive bibliography make this the reference book of choice.



These more specialized titles are also worth gathering:

Internet Security for Business by Terry Bernstein et al. (Wiley & Sons, 1996) delivers just what it promises, a thorough look at a variety of total security programs. Firewalls alone may not be enough when hackers choose your company as a target. Every security scheme is evaluated in terms of the trade-offs between opportunities and risks.

Strategic Internet Marketing (Que Corp., 1996) by Tom Vassos makes the smart assumption that effective Internet marketing is more about firing rifles in single rounds at a bull's eye than randomly blasting buckshot from a shotgun and gives advice on the entire sales cycle—from market research to closing a sale on the Internet. Michael Mathiesen's **Marketing on the Internet** (Maximum Press, 1996) covers similar ground but includes an especially enlightening chapter on Internet marketing success stories. Both marketing books are quick how-tos.

You'll find Andrew Dahl and Leslie Lesnick's **Internet Commerce** (New Riders Publishing Co., 1996) an intelligent guide to planning, executing and running a digital storefront. Particularly helpful is a chapter that compares the services, policies and procedures of different Internet commerce providers. No theory here, just solid advice. And McGraw-Hill has reissued Phyllis K. Sokol's classic work on EDI, **From EDI to Electronic Commerce** (1995), with new insight on recent EC developments.

Finally, Frank Fiore's **Dr. Livingstone's Online Shopping Safari Guidebook** (Maximum Press, 1996) reviews hundreds of EC Web sites for price, selection, convenience, service and security.

—Perry Glasser



INTERNET SECURITY

8:25 a.m. - he arrives at work and logs onto his PC. At 8:45 he unknowingly destroys

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8:51 a.m. - he goes for coffee.

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Trendlines

The Mighty Pen

ELECTRONIC SIGNATURES Every minute, 2.3 million signatures are committed to paper in North America. Because most business deals still require participants to sign on the dotted line, companies that depend on contracts but want to engage in electronic commerce must find a reliable way to capture online signatures.

One solution, PenOp software from PenOp Inc. of New York, combines biometric signature verification and cryptography to create what the company calls the legal equivalent of a handwritten signature on paper. A user signs her name with a digitizer, and the software stores the signature as an encrypted data object linked to the

signed document. The signature cannot be reused, because the data object includes contextual information about the act of signing—including a time stamp, the “gravity prompt” or reason for signing that was displayed to the signer, the claimed identity (such as name or ac-



count number) of the signer and a cryptographic checksum of the signed document.

In addition to reducing paper handling costs, the software can speed business processes and deter fraud. PenOp creates templates of people’s “signing behavior,” including speed and stroke direction, based on a series of signatures. Instead of just accepting or rejecting a signature, the software checks it against the template and provides a score of 0 to 100. For a \$5 purchase, a score of 40 might be acceptable; a Porsche dealer might require an accuracy rating in the high 90s before delivering the goods. For more information about PenOp, which works with Microsoft Windows, IBM OS/2 and PenRight from Deluxe Corp., visit www.penop.com. ■

Is Your Network Ready for Commerce?

NETWORK SECURITY With everyone fretting about Internet security, CIOs should welcome the latest opus from Open User Recommended Solutions (OURS), a nonprofit organization that provides a forum for users and vendors to develop practical guidelines on strategic IS issues. The report, *Recommendations for Providing Secure Business Service over External Networks*, defines the various threats besetting companies doing business online and identifies eight protective devices. It also includes diagnostic worksheets in the form of matrices devised by the OURS Information Protection Task Force. One helps determine what security measures are needed, another identifies protective technology already in place, and a third combines the two to provide a list of recommended levels of security by service segment.

Task force member Mark Freund, an information protection consultant at Pacific Gas and Electric Co. in San Francisco, has already put the report to use. “It’s forced us to step back and take a more global look at our [security] effort and see where we needed more enhancements,” he says. “In fact, we’ve already put a couple of projects in place using that document as the primary framework.”

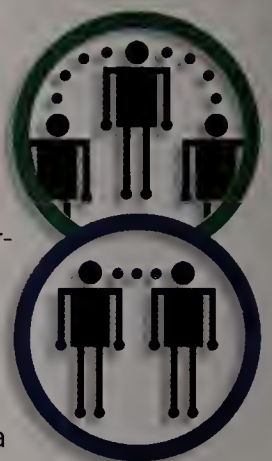
For details visit www.ours.org, or e-mail ours@sba.com. ■

Safe Passage

WEB SECURITY RATINGS You can’t be totally sure the personal data you just sent over the Web won’t be tampered with, stolen or otherwise mishandled. But efforts by Web watchers like eTrust (www.etrust.org) may alleviate some of your concerns. Starting in January 1997, companies can pay to be accredited by eTrust, a coterie of Internet and EC groups that support secure online transactions. If they adhere to specific security guidelines, companies may post on their Web sites eTrust symbols (like those above) that signify the level of privacy offered.

For \$8,500 per server, the National Computer Security Association (NCSA) checks out a site’s security measures, such as firewalls, filtering routers and encryption mechanisms, and allows qualifying site owners to boast on the Web that they’ve passed the test. NCSA (www.ncsa.com) also performs random audits of certified sites.

For wary consumers, the Multicheck (www.multicheck.com) database offers background—such as managers’ names and complaint histories—on companies that peddle wares on the Web. And to satisfy the extra-cautious, Multicheck’s search page also links to the Better Business Bureau. ■



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Blueprints for the Electronic Store

Interactive electronic sales will call for new IT architectures and infrastructures

BY BARBARA REILLY

TO REACH NEW CUSTOMERS and open new markets, participating in an electronic marketplace (EM) is tremendously more cost-effective than building new stores and hiring more salespeople. During the next few years, as more goods and services are purchased through EMs, customers will begin to expect immediate answers to their questions regarding a product's price, availability and shipping dates. If customers are

unhappy with the answers, they will expect to be presented with immediate alternatives.

None of today's interactive electronic commerce (EC) systems is swift enough to supply these instant choices—and senior managers soon will demand systems that can. Unfortunately, many early attempts by enterprises to develop them will provide only inflexible and unfriendly “front ends” to enterprise applications that were not designed to meet the

needs of EC. Companies will deploy three styles of Internet-compatible online transaction processing (OLTP) application architectures—distributed presentation, remote presentation and distributed function—to meet the demands of interactive EC.

■ **Distributed presentation.** The best example of distributed presentation architecture is “screen scraping,” the process by which information originally presented on a dumb terminal screen is captured and reformatted for presentation on a browser, where it can be manipulated. The application that generates the screen image remains behind the enterprise's firewall, except for the presentation veneer, the GUI. Tools such as Sterling Software Inc.'s Star Flashpoint for the PC, Century Analysis Inc.'s CL / 7 for Unix systems and Platinum Technology Inc.'s Integrator for mainframe-based systems screen scrape transmissions from dumb terminals over the Web, convert the screen image (the terminal map) on a dumb terminal into hypertext markup language pages and pass them to a Web browser. While limited in functionality, distributed presentation is quick and inexpensive to implement.

■ **Remote presentation.** With remote presentation architecture, all user-interface functionality, such as user interaction, local validation, form navigation and workflow, remains on the Web. Transaction processing, how-

ever, remains within the enterprise behind the firewall. Some 80 percent of an enterprise's Internet-compatible OLTP applications likely will use a remote presentation configuration because of the improved functionality that Web browsers provide. This configuration provides public access to certain enterprise functions without exposing internal systems to the public.

■ **Distributed function.** With

Distributing Functions for Distributive Computing

For electronic commerce to develop, transaction applications must be shared by customers and suppliers in the new electronic marketplace

EC TODAY



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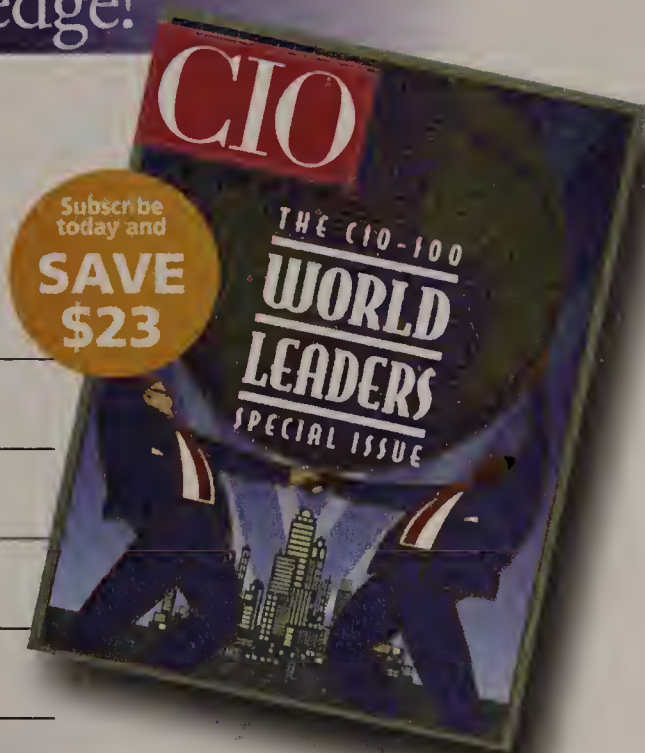
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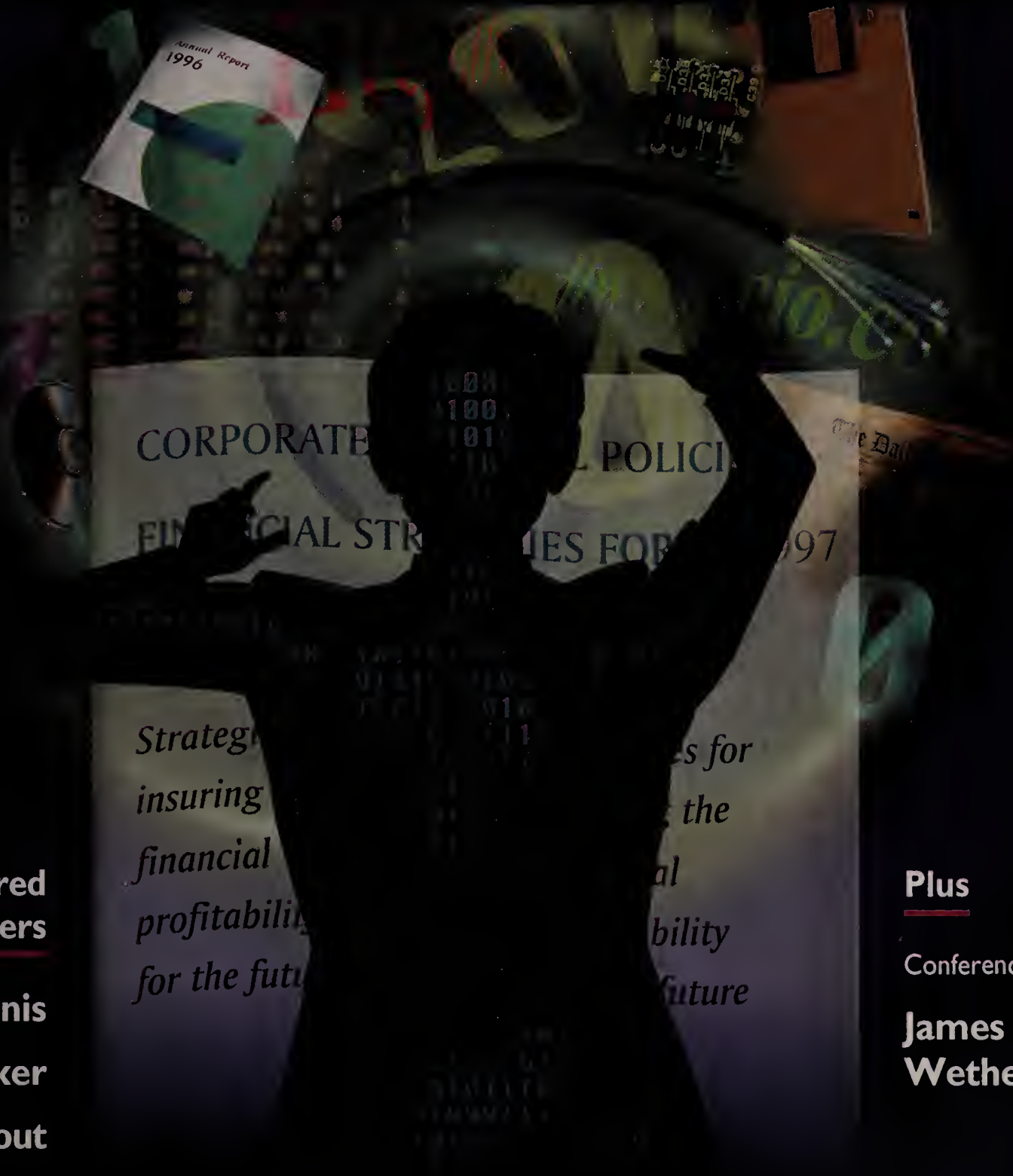
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Conference Preview

Leading the Charge in Turbulent Environments *IT as a Change Agent*

March 23-26, 1997 • Sheraton San Diego Hotel & Marina • San Diego, California



Featured Presenters

Warren Bennis
Peter Drucker
Jack Trout

Plus

Conference Moderator:

**James C.
Wetherbe, PhD**



CIO PerspectivesSM Conference

Leading the Charge in Turbulent Environments: IT as a Change Agent

March 23-26, 1997 • Sheraton San Diego Hotel & Marina • San Diego, California

When Descartes said "the more things change, the more they stay the same," he had never tried life as a CIO. As corporations continue to reinvent themselves to be more efficient, flexible enterprises to compete in today's marketplace, we will find IT at the hub of these strategic changes. More than ever, companies regard IT as a global strategic tool: but are CIOs the right leaders to effect these changes? Although IT is the driving force behind much corporate change, really making change work means something far greater. IT executives must examine the difference between leading and managing strategic change. From managing the CEO's expectations to defusing resistance to new technical projects, a change agent does far more than decide on the new architecture for the company.

The latest in our *CIO Perspectives* Series, **Leading the Charge in Turbulent Environments: IT as a Change Agent**, is designed to address the multiple drivers and aspects in the change process including technological innovation, "right sizing" and

economic influencers as well as the human factors such as leadership dynamics, communication challenges, behavioral impact and implementation.

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Vice President
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Our keynote session will feature a dialog between **Peter Drucker**, the world's most noted authority on corporate management, and **Warren Bennis**, Founding Chairman of the Leadership Institute and world renowned leadership authority. **Jim Wetherbe**

will return as the conference moderator, and **Jack Trout**, marketing guru, will discuss the most important "mental" elements in the positioning process, as well as dealing with the twin realities of change.

To participate in **Leading the Charge in Turbulent Environments**, visit our Web site at <http://www.cio.com> or complete the enrollment form on the back of this brochure and fax it to us at 508-879-7720. You may also call our conference hotline at 800-366-0246. Join your colleagues and peers for 1997's most important conference on change.

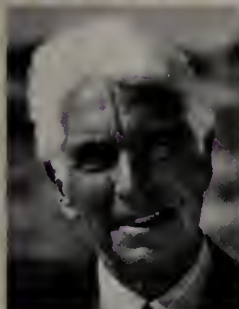
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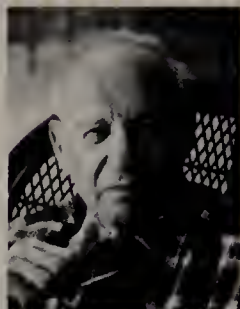
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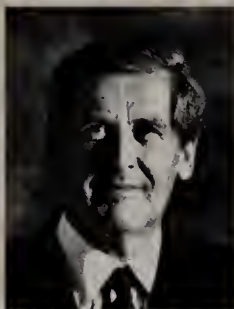
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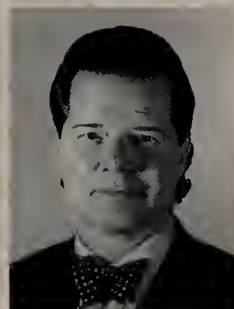
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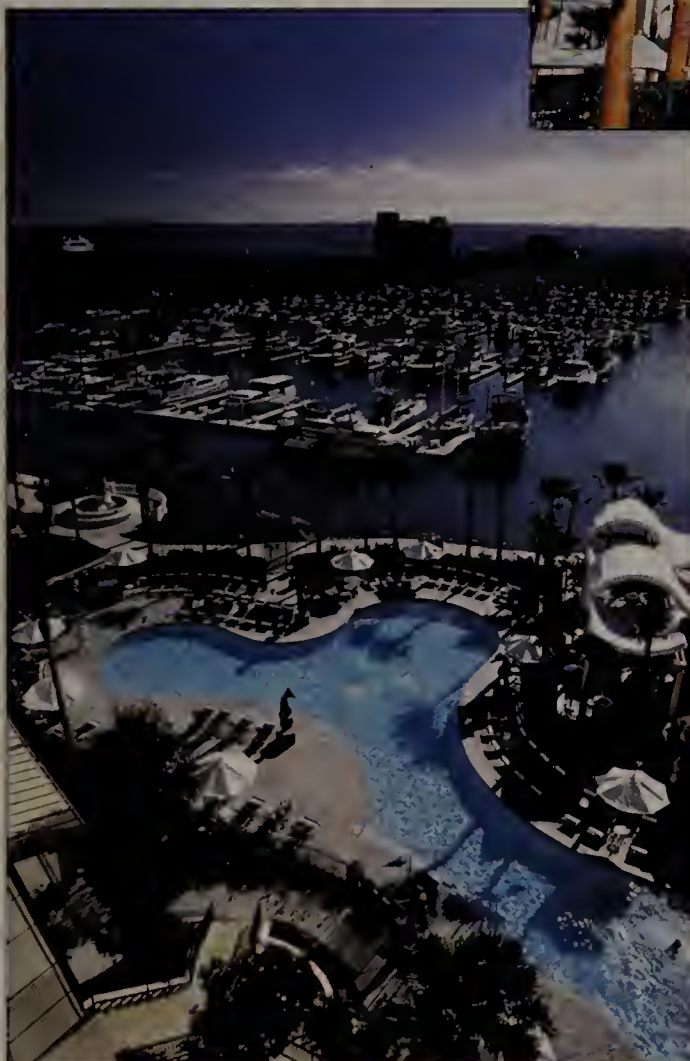
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Gartner View

distributed function architecture, business functions other than the user interface logic can be performed on the Internet or in the EM, and EM applications can interact directly with the enterprise's applications. The programs that perform

the public side of the distributed function may be downloaded to the client machine (as Java programs are), or they may be common gateway interface applications invoked by the target Web server. The data access for a transaction remains

within the enterprise behind a firewall. Application programs on the public Internet side are limited to editing, simple calculations, formula-based business rules, and message marshaling and communications. Much of this is a form of

The Tools of the Future

Key technologies will change to enable reliable Web commerce

MOST ENTERPRISES ARE focusing their attention on the Internet and Web as electronic marketplace foundations, but many of the technologies are as overhyped as the Web has been. The availability and viability of the foundation technologies—such as network backbones and access, end-user

platforms, and content and applications tools—are paramount to successful EM participation. Gartner Group Inc. expects each key technology to be ready for real-world, commercial EM applications, which will be the dominant technologies of each time period.

—B. Reilly

KEY TECHNOLOGIES	DOMINANT TECHNOLOGIES OF THE TIME PERIOD		
NETWORK	1996	1998	2001
LAN	Software hubs	Pre-ATM	ATM
WAN	T1/FR	ATM/T3	ATM/OC-3
Personal	28.8Kbps PPP	ISDN BRI	Wireless
SERVERS			
HW, small	NT, Unix	Large RAM SMP	Outsourced
HW, large	Unix cluster, SMP	Distributed SMP cluster	Scalable I/O, parallel DB
SW, small	Unix, Mac, NT	Unix, NT	Unix, NT
SW, large	Unix	Unix	Unix, NT
USER SYSTEMS			
Access SW	Browser	Bundled browser	Integrated browser
Access devices	PC	PC	PC, set-top
SOFTWARE			
Web page	Manual tagging	Visual tools, early suites	Visual tools, integrated suites
Applications	Database access	Robust transmission	Secure transmission
CONTENT & APPS.			
Info. publishing	HTML 2.X	HTML 3.X	VRML
Applications	CGI scripts	CGI/NDF	NDF
MANAGEMENT			
Security	Firewalls/access	Encryption, nonrepudiation	Authentication, data integrity
Tools	Niche: troubleshooting	Suites: perf./app. monitoring	Integrated NSM infrastructure

Abbreviations key:

ATM = Asynchronous transfer mode
BRI = Basic rate interface
CGI = Common gateway interface
DB = Database

FR = Frame relay
HTML = Hypertext markup language
HW = Hardware
ISDN = Integrated services digital network

NDF = Network dynamic functionality
NSM = Network systems management
OC-3 = Optical carrier-3 (155Mbps)
PPP = Point-to-point protocol

RAM = Random access memory
SMP = Symmetric multiprocessing
SW = Software
VRML = Virtual reality markup language

SOURCE: GARTNER GROUP INC.

“Getting all my

networks to work

together is like

trying to organize

a plate of

spaghetti.”



If you read the papers you know something's up at IBM Networking. There's been a drumbeat of new products. Whispers about technology alliances and more productive ties with key resellers. And bullish reviews of something called Switched Virtual Networking.

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Gartner View

remote presentation architecture, though only when the application business rules are performed on *both* sides of the fire-wall is the architecture a true distributed function.

Gartner Group Inc. estimates that 10 percent of all Internet transaction processing applications will use distributed function partitioning by the year 2000. Businesses and consumers will have the desired immediate response because local transaction components will be close by on the Web. By then, the applications often will have been developed specially for distribution across the Internet. Message queuing may be used in the distributed function mode to achieve high client responsiveness for the applications that do not require synchronous integrity.

Of the three, the distributed function architecture provides the most flexibility. Unfortunately, at this time it is also the most difficult to implement. OLTP applications must change substantially to

To reach new customers and open new markets with EC, large companies will have to invest millions of dollars in adequate hardware and network capacity.

allow public and private applications to be synchronized via mutually agreeable business rules deployed in the EM *and* the enterprise—challenges much like those that accompanied the earliest implementations of EDI.

To Reach the Customer

OLTP applications were not designed to interface directly with consumers, who don't have an in-depth understanding of the enterprise's business processes, data and coding structures. To reach new customers and open new markets with EC, large companies will have to invest millions of dollars in adequate hardware and network capacity, develop new applications, and transform their sales, marketing and distribution processes to accom-

modate usable and appealing front-end systems. Most enterprises will be reluctant to do so because of the cost and the time required for implementation.

Nevertheless, enterprises should equip their OLTP applications and databases to handle EC by adding functionality. An EC clearinghouse system that can support messaging and can interface with applications via object request brokers (ORBs) is significantly faster than today's EDI systems.

Most of today's enterprise applications can't support interactive EC because they comprise a variety of incompatible hardware, software and data descriptions. Because they were intended to link application systems across enterprise boundaries—not to present



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information or process interactive transactions—many EC infrastructures are designed to support only business-to-business EDI batch exchanges and data translation. Such enterprise applications cannot be used as a foundation for an EC infrastructure that must link Web-based EC and traditional transaction-processing systems. The challenge is to design systems that support the following:

- distributed-function Internet-capable OLTP
- concurrent interactive users
- a robust application programming interface to application systems

Message Brokers

In a large, multidivisional enterprise, the information needed to interact with an EM user is often spread across several databases managed by several applications. Responding quickly to an EM user's request requires the high-speed transformation of the EM user's information and interfaces with applications

on different platforms. One solution is to implement "message brokers," which allow communication among multiple parties on disparate application systems. Because techniques and enabling tools such as IBM Corp.'s MQSeries, Gartner Group expects this approach to become common in large enterprises during the next five years.

Message brokers recognize that messages from one source system may be relevant to many consuming systems, that multiple sources may be of interest to each application system, and that messaging among heterogeneous applications is "many to many." For example, if an address change is fed into one system, that system must notify 10 other systems of the event. Ordinarily, that requires 10 different messages or file transfers, but with a message broker, the source application sends one message in one format, and the broker translates it and relays it to all 10 applications.

Message brokers can be set within dif-

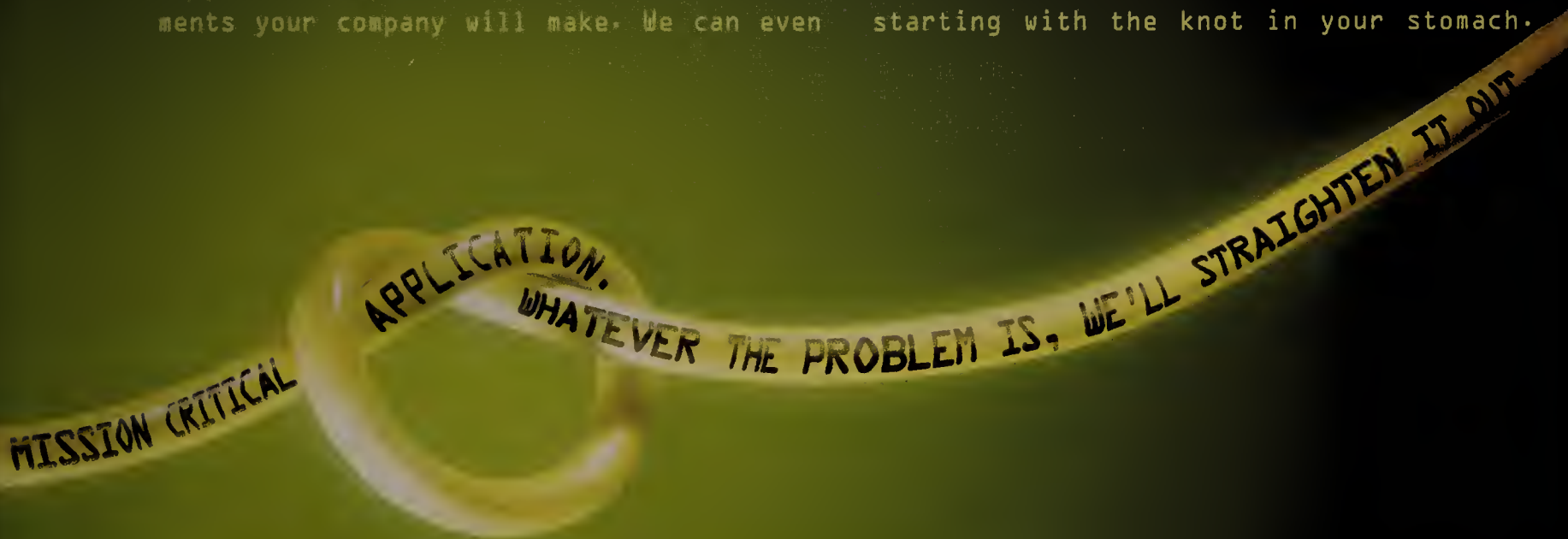
ferent configurations, and they can use elementary, one-to-one forms of middleware—for example, most remote procedure calls, message-oriented middleware, ORBs or transaction processing monitors—to handle message delivery. But message brokers still need more features to translate messages and other features to support the "many to many" demands of EC.

Gartner expects rapid, continued development, rollout and adoption of Internet-based technologies and applications for EC. Today, no EC clearinghouse systems support interactive EC—and Gartner Group does not expect that they will before early 1998. Until then, enterprises that want to support interactive EC must develop their own clearinghouses using a variety of middleware tools. **CIO**

Barbara Reilly, a product manager in Gartner Group's Electronic Commerce Strategies service in Stamford, Conn., can be reached at breilly@gartner.com.

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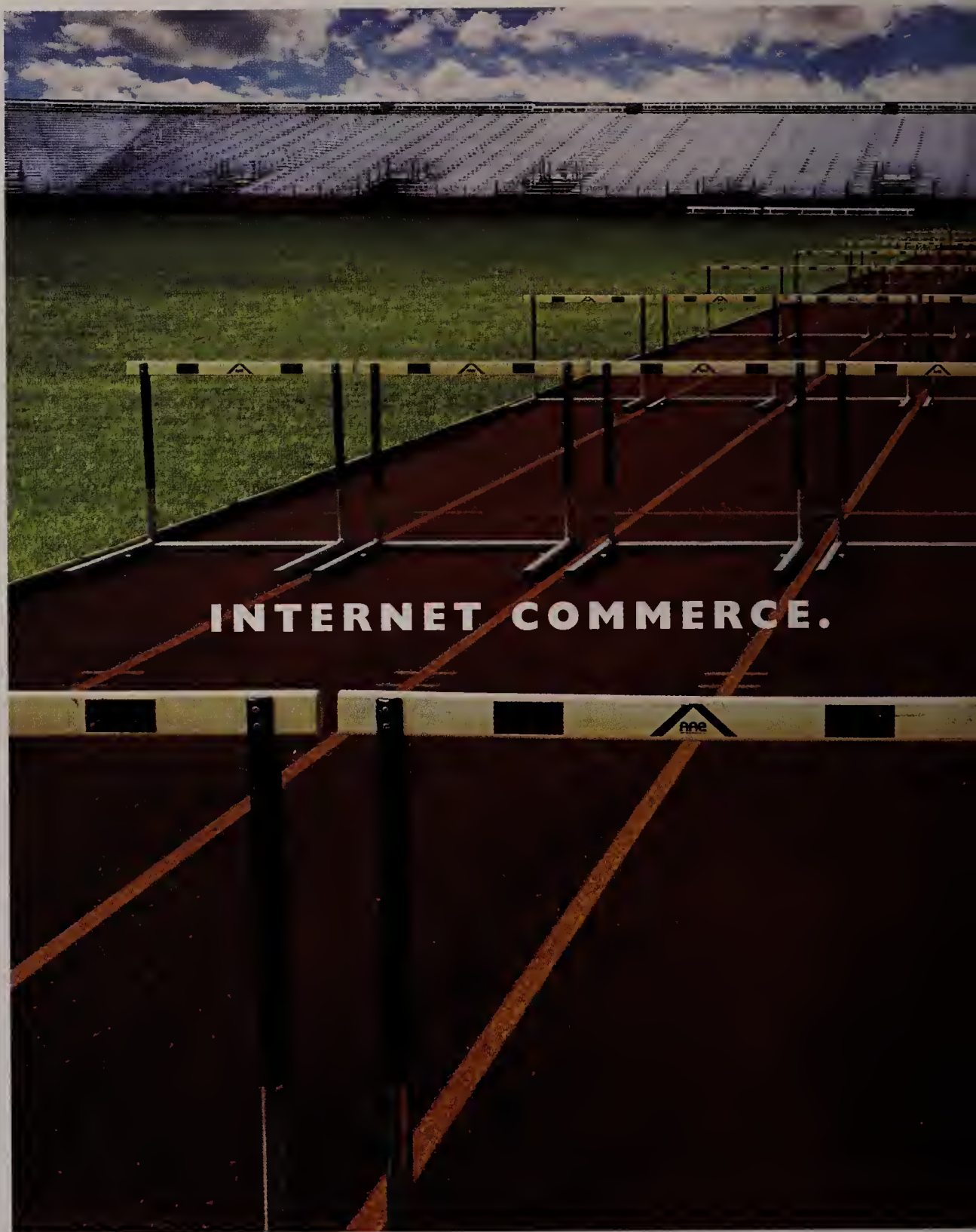
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Electronic Commerce

PHOTO: TONY RALPH/MIAMI HERALD

INTRODUCTION

The hacker was Nathan Meyer Rothschild, head of the London branch of the international banking business that still bears the family name. The system he cracked was the Optical Telegraph Network (first built in 1791 by Frenchman Claude Chappe), a series of signal towers whose pulleys, lights and cross-arms could send any of 25,392 encrypted signals on line-of-sight up to 12 kilometers. Don't laugh. Eventually, 29 continental cities were linked by 556 stations over 4,800 kilometers—roughly the distance from New York to Los Angeles.

Back in 1815, state-of-the-art technology meant having the fastest carrier pigeon to cross the English Channel, sort of a dedicated VAN with wings; once Rothschild's agents cracked the French system's code, his birds brought him the skinny on a small affair in a backward Belgian town called Waterloo. During the terror-filled hours when the London market believed Bonaparte had won the day, Rothschild clambered through the window of opportunity his disinformation had pried opened.

The technology has changed since the Duke of Wellington's victory, but the concerns of business remain the same. If money is the blood of commerce, most businesspeople know that information is the heart. Money won't flow without a push. Commerce

Electronic Commerce

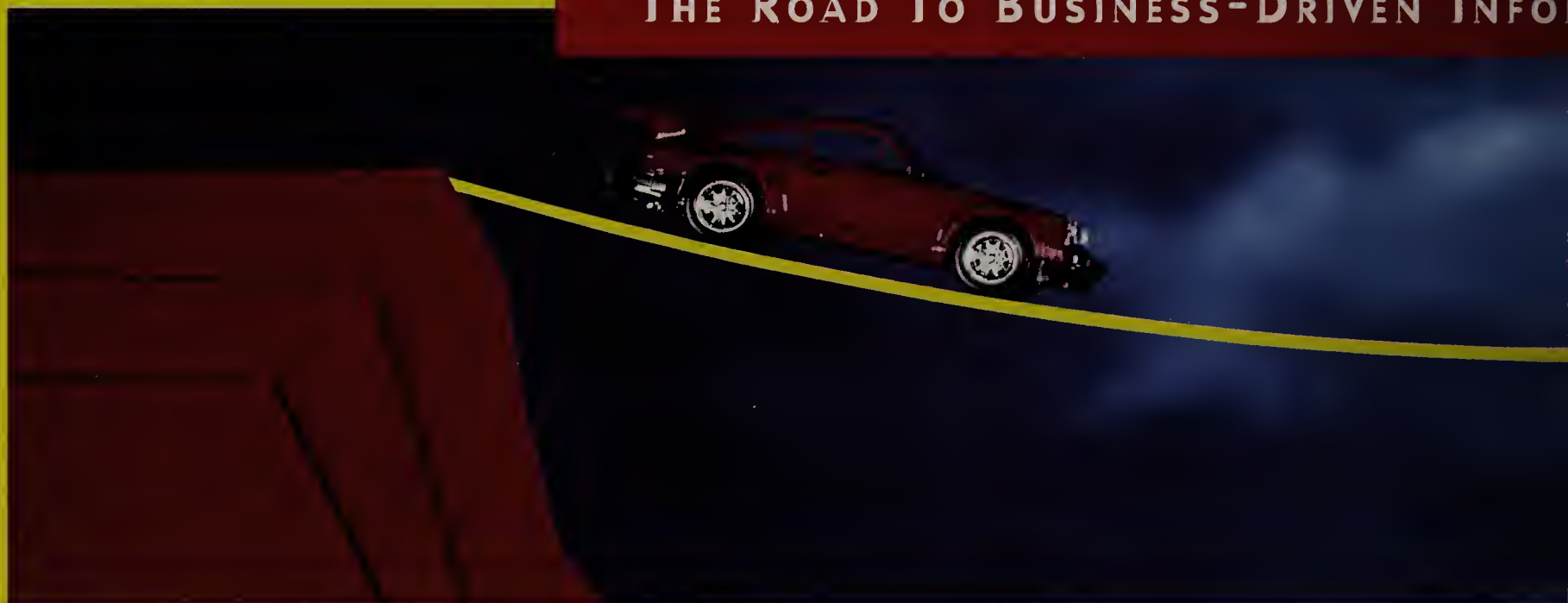
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CHOOSE A PARTNER WHO KNOWS THE WAY. The competitive edge delivered by today's advanced distributed technology is critical. But the costs can be outrageous - as much as ten times purchase price to maintain and service the average desktop. That's why IT executives are being

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as author Ravi Kalakota (see Page 28 for a review of *Frontiers of Electronic Commerce*); Pete Jacobs, manager of electronic commerce at 3M (see 3M profile, Page 80); Daniel Dardailler, project manager for the Joint Electronic Payment Initiative (JEPI); Tom Patterson, chief strategist for EC at IBM; Thomas J. Smedinghoff, partner at McBride, Baker & Coles and chair of the Electronic Commerce and IT Division at the American Bar Association; Barbara Reilly, EC analyst at Gartner Group Inc.; and Phyllis K. Sokol, author of *From EDI to Electronic Commerce*. Join us at www.cio.com/forums/ec.html.

CIO's online Electronic Commerce Resource Center can be viewed at www.cio.com/CIO/rc_ec.html.

demands open, secure channels. Only today it's all happening at high speed over global networks. As the pulse of business grows ever more rapid, CIOs find themselves at the center of the electronic commerce (EC) revolution.

But just where is that center? What *is* EC, anyway? In this issue, we explore the dimensions of electronic commerce. We look at current best practices and report on what your colleagues are doing today and what they plan to do soon, which technologies companies are investing in and which technologies they are not yet ready to embrace. Our hope is that this will give you what you need to know so that you can do what you need to do in the very best way possible—*now*.

While we don't pretend to have all the answers to the questions that motivated us to create this special issue, we hope you'll discover a few insights that lead to answers of your own. In the process of our reporting, we were astonished once more by the creativity of business and its ability to mesh ideas and varied technologies into ventures that work, grow and change the face of the world as we know it. The challenges of electronic commerce are opportunities, not the CIO's Waterloo.

—Perry Glasser, Associate Editor

FOR SALE
EC Shopper

The tagged items noted throughout this issue are available on the Internet. A master list with links may be accessed from our Web site, www.cio.com.

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Key # 23057





The electric handshake

More than a new type of transaction, online commerce is changing the fundamental buyer/seller relationship

BY HEATH ROW

Whether business needs are changing technology or technology is changing business, building ongoing business relationships has emerged as a critical part of electronic commerce (EC), primarily because of the popularity of the Internet and the World Wide Web. In the late 1980s, when EC began to mature, it consisted largely of technologically complicated electronic data interchange (EDI) and online financial transactions between businesses. Now, as the point-of-sale transaction foundation of Olde Commerce crumbles, the architects of New Commerce are building on a base of ongoing customer service and such cornerstones as do-it-yourself configuration, help desks and "any time, anywhere" service. Vendors, manufacturers, distributors and suppliers are using EC to create new revenue streams, open new markets and retain current clients.

Reader ROI

FOR SOME COMPANIES, electronic commerce is nothing more than financial transactions that use information technology. For others, EC encompasses a full sales cycle—including marketing, selling and eventually discontinuing or upgrading outmoded products and services. This overview will bring these EC issues to the foreground:

- ▶ Current technologies, practices and challenges
- ▶ Immediate and long-term benefits
- ▶ Pitfalls
- ▶ Future developments

EC and other IS demands are changing the CIO role.

As business continues to learn how technology can further commerce, however, many businesspeople are hard-pressed to define EC. "My biggest challenge when I started [exploring electronic commerce] was trying to pin down a definition," says Judith Cohen, director of American Management Systems Inc.'s Internet and electronic commerce lab. Cohen, who works in the AMS Center for Advanced Technologies in Fairfax, Va., says most EC activity undertaken by the systems integrator's clients falls into two camps: business-to-business commerce and consumer retail. "You can see people trying to separate the two," she says.

"They have different challenges, different market implications and different technological implications."

Relationships

Regardless of whether your business targets companies or consumers, it's a mistake to look at EC as just a transaction, says Michael Taylor, a director of the telecommunication, information, media and electronics practice at Cambridge, Mass.-based consultancy Arthur D. Little. "The purchase transaction itself is very much subordinate and the least significant of all the information transactions," he says. "Anything that tightens your relationship with an existing customer increases the revenue you get from that customer."

The evolution of electronic commerce coincides with the elevation of business relationships and customer cultivation to key business strategies. Just as many reengineering evangelists have stopped pushing reengineering for cost cutting and started pushing transformation for growth, companies and vendors in the electronic mar-

Electronic commerce pioneers

Customer service

American Airlines Inc./The Sabre Group Fort Worth, Texas

The Sabre Group of Fort Worth, Texas, now an independent company that spun off from American Airlines in the fall of 1996, grew out of the company's Semi-Automated Business Research Environment, a nationwide data processing system in operation since 1959. Initially, travel agents could use Sabre to create a complete flight reservation for customers and access the data from anywhere in the country. By the mid-1960s, the system expanded to car and hotel reservations and included an online catalog of theater tickets, bon voyage gifts, flowers and other travel-related goods and services. In 1985, American introduced EasySabre, a PC counterpart for consumers.

Although Sabre was formed to keep track of American's seats, flights and reservations (the airline once used color-coded index cards and a Lazy Susan), the company now offers decision-support systems and consulting services to businesses in the travel, transportation, shipping and food service industries, as well as to government agencies. The Sabre network, the world's largest privately owned, real-time computer network, embraces mainframes, PCs and distributed systems to handle 25 percent of the world's airline reservations and 80 percent of rental car bookings in the United States.

Sabre's customer service and online travel booking trajectory set the standard for similar services, such as United Connection, United Air Lines Inc.'s service that allows PC users to reserve and purchase travel services from airlines, hotels and rental car companies. Originally an in-house system, Sabre is now connected to more than 300,000 computers in 74 countries on six continents.

—Heath Row



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ketplace are concentrating less on individual sales and more on using IT to form partnerships with client companies and to foster relationships with consumers. It's a softer sell, but it's a sell nonetheless because the underlying motive is to make more money. "When is a relationship a relationship and not an extortion?" asks John Jordan, senior consultant with Computer Sciences Corp. (CSC) of El Segundo, Calif.

Encouraging continuous contact with clients by helping them determine their purchase requirements, acquire a product, use a product and replace a product can be the real strength of electronic commerce, says Rick Watson, an associate professor of MIS at the University of Georgia in Athens. "It's much more than

buying and selling," he says. "Commerce is about retaining legitimacy and operating in the long run. It's providing an ongoing service for customers."

Ultimately, EC strengthens all the elements of the sales cycle, from marketing to product support. It includes the use of IT leading up to a sale, the sale itself and customer service following the sale. It encompasses IT-enabled advertising, sales and marketing on the Web, interactive voice response customer service systems, computer help desks, value-added networks, customer and product databases, EDI, magnetic tape exchanges, electronic catalogs, smart cards, electronic payment schemes and automated teller machines. Basically, anything simultaneously involving technology and business or commerce is under the umbrella of EC. While such a broad definition of EC is necessary to strengthen ties between buyers and sellers, Taylor says some companies will require a radical change in thinking.

IS and EC

Because of these developments, IS will have to take more ownership of their projects. Jordan says that as EC draws more on credit card information, database queries and multimedia files, the content of specific transactions matters more than it might have

before. "When transactions were all based on numbers, the IS organization knew that the data they had was data," he says.

"The content of that data was irrelevant to them."

Gordon Brooks, senior vice president of Cambridge Technology Partners, a professional services firm based in Cambridge, Mass., says that EC and other IS demands are changing the CIO role. Because the data and user needs are different from Olde Commerce, CIOs and other IS professionals need to look at EC projects from a cross-functional business perspective. By considering the behavioral components of IT implementation as well as the technology itself, CIOs will be better able to roll out successful EC applications and services. "Consensus, multiple constituencies and business processes [are important]. Multiply that by 10 when you're dealing with electronic commerce," Brooks says. "Most people in a company don't realize what technology can do for them. The CIO can be the conduit and the link between what is possible and what is done."



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• Electronic commerce pioneers

EDI supply chain logistics

Allegiance Healthcare Corp., Deerfield, Ill.
(formerly Baxter International)

To reduce costs and gain a competitive advantage, in 1976 Allegiance developed its Analytical System for Automated Purchasing (ASAP), through which customers could purchase supplies using touch-tone telephones and receive electronic acknowledgments. That early EDI initiative evolved in the 1980s to become the OnCall*EDI turnkey package. Separately, Allegiance developed ValueLink in 1989, an EDI-enabled "stockless" inventory management program that delivers hospital supplies on a just-in-time basis.

Because PCs, mice and Windows were not part of customers' purview, Allegiance developed the turnkey EDI packages. Allegiance, like most EDI "hubs," had difficulty convincing suppliers to embrace EDI, so the company recently adopted a "get-tough" policy, declaring that suppliers not sending invoices via EDI as of December 1996

would suffer a 20 percent payment deduction.

ValueLink has saved client hospitals more than \$200 million, and Allegiance's sales from its 130-plus ValueLink accounts increased by 28 percent to more than \$650 million last year. Overall, EDI slashed purchasing and accounts payable operating costs by 20 to 40 percent and reduced errors and rework by 40 to 60 percent. Market share increased; inventory diminished.

Allegiance now wants to "close the loop" in electronic business transactions, capturing information that will help it replenish the customers' supplies automatically—without a purchase order. "The ultimate goal is for the EDI transaction to trigger a message to the manufacturer to make more product," says EDI Director Daniel Browning. "And we would like to tap into patient surgery schedules so that our products can arrive at the treatment facility when the patient arrives."

—Richard Pastore

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Informing Customers

To capitalize on the opportunity for future sales offered by EC, companies will need to use IT to provide clients and customers with information about their products and services, Taylor says. By helping potential customers use technology to search, compare, track, receive and service products—under their own brand or another—companies can communicate what clients need to make decisions. They can offer the information clients need outside their traditional sales and marketing channels, too, says Ken Horner, New York-based global practice



director of new media/electronic commerce for Deloitte & Touche Consulting Group. For example, General Motors Corp. makes information about its automobiles available through non-GM databases like Microsoft Corp.'s CarPoint (carpoint.msn.com), which comprises pricing information, safety features and specifications for vehicles from numerous automakers. GM might not control the information flow, but the company can be a direct beneficiary of people having that information.

"Anything that tightens your relationship with an existing customer increases the revenue you get from that customer."

—Michael Taylor

But what happens if you lose control of your product information or if another enterprise uses IT to provide information services your company usually controls? Will your information service functions be undermined? Paul Gustafson, a senior partner with CSC, says disintermediation of information services need not happen. Sometimes, EC endeavors require enterprises to reconsider core business practices and be more open to outside ideas—or letting internal ideas filter outside. As once-major players in marketplaces like the travel industry face disintermediation brought on by information providers that step off the starting blocks faster than travel agents and other traditional booking services, enterprises need to keep pace or get out of the race. United Air Lines Inc. offers United Connection, a dial-up reservation service that contains flight information for more than 500 air-

Electronic commerce pioneers

EDI supply chain logistics

Wal-Mart Stores Inc., Bentonville, Ark.

Wal-Mart began using Universal Product Code (UPC) scanning at its registers in 1980. While other companies accrued data, Wal-Mart's IS group discovered information—information it transformed into action. As early as 1981, Wal-Mart installed video monitoring devices that transmitted information on buyers' habits to the Bentonville headquarters from all its stores. Wal-Mart had centralized its IS operation in 1984. By the following year, individual stores were sending data to headquarters via a Hughes Network Systems Inc. satellite. By 1992, Wal-Mart had 14 "smart" warehouses and a logistics operation that never left a truck empty, able to choreograph the motion of every Q-Tip, casserole dish and cubic zirconia stocked. The strategy was simple but revolutionary: Rather than push goods to the stores, which in turn pushed them to the customers, Wal-Mart allowed customers' preferences to pull the goods most in demand.

lines, including United. By being less territorial about product and service specifications, branding their information aggregation services and mastering the information channel, companies can flex their market muscles and strengthen their positions while providing an industrywide service, Gustafson says. "Out of the digital channel that's emerging, we're seeing some new fundamental business processes," he says. "It's caused us to rethink what is proprietary. We have to disintermediate the commodity and reintermediate the value."

Security and Caution

But Brooks says many companies move into the electronic channel too quickly in order to get EC projects to market. Even though time-to-market is a widespread IT concern, it is a bigger problem in electronic commerce efforts because if a company is starting from scratch, the learning curve can be steeper than usual. As technology develops more quickly and cycle times shorten, large companies often jump into projects without motivation other than a fear of spry startups such as Netscape Communications Corp. or other young companies some people think now lead the pack of larger enterprises. And if less-nimble enterprises jump the

What's more, Wal-Mart emphatically persuaded its vendors to participate in its technological revolution of the retail industry. While some manufacturers balked at the idea of doing business on Wal-Mart's terms, others agreed to work with the chain of stores to remove a few steps from the sales process—and they, too, profited from their flexibility. Procter & Gamble Inc., for example, became Wal-Mart's primary vendor, but only after some tough negotiation.

In 1991, Sam Walton's general store and vision became the nation's largest retailer, surpassing Sears, Roebuck and Co. Discount chains around the world have had to adapt to compete under Wal-Mart's onslaught, and the face of retailing has changed forever.

—Ruth Greenberg

gun without the necessary know-how, they could trip. "A lot of people just feel they have to get there because if they don't, they'll get left out," Brooks says.

Companies also need to approach electronic commerce differently from other business applications of IT because EC projects are more visible to customers and clients. "You have to worry more about the image and the quality [of the project]," Brooks says. "It might be *the* view to the customer."

One-to-One

While a more personal focus and one-to-one marketing might be a benefit of EC, it can also be a hindrance. Consumers are concerned about their privacy as well as the legitimacy of online vendors, says Jim Miller, a research scientist for the Cambridge, Mass.-based World Wide Web Consortium (W3C) in MIT's Lab for Computer Science. Similarly, companies want to be sure customers and clients are who

• Electronic commerce pioneers

Electronics funds transfer

Visa International Inc., San Francisco

During the 1980s, Visa International encircled the globe with fiber-optic cable that carried the record of millions of daily transactions to one of Visa's large computer centers in England or the United States. In February 1996, Visa—along with MasterCard International Inc. and a handful of information technology players—announced the development of the Secure Electronic Transaction (SET) standard for securing credit card purchases over the Internet.

Prior to the establishment of the SET standard, Internet commerce remained a dream. Merchants and credit card holders had no assurance of security for purchases over the Internet. With the development of the SET standard, an entire industry was unleashed. Shoppers and merchants alike could now feel safe swapping information

and electronic products via an open network.

Visa today stands ready to blaze an electronic commerce trail. With more than 500 million credit cards issued worldwide and 20,500 member financial institutions, Visa is poised to take the lead in Internet-based credit card transactions. If all goes according to plan, the SET specification should help Internet commerce achieve its Manifest Destiny.

Electronic commerce holds a big place in Visa's future. The company is in the process of rolling out several IT-based financial services, including microchip-embedded cards such as Visa Cash, a "stored value" card for small transactions. Another prepaid card in the offing is Visa TravelMoney, which will provide destination currency for travelers.

—Megan Santosus

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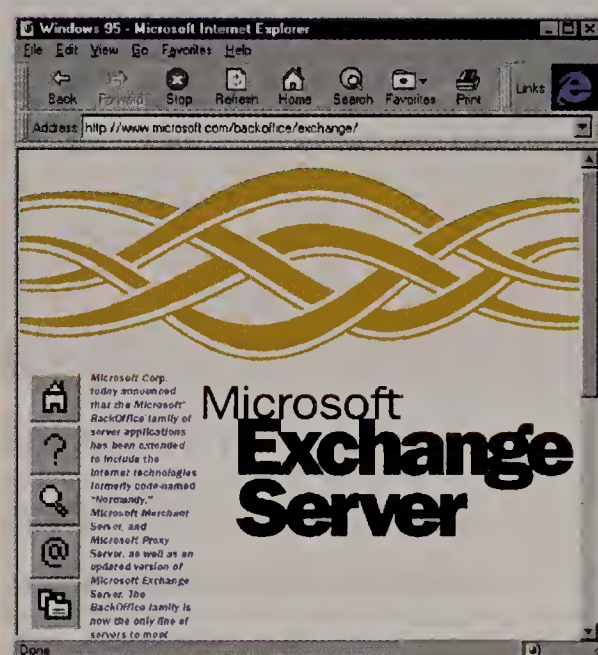
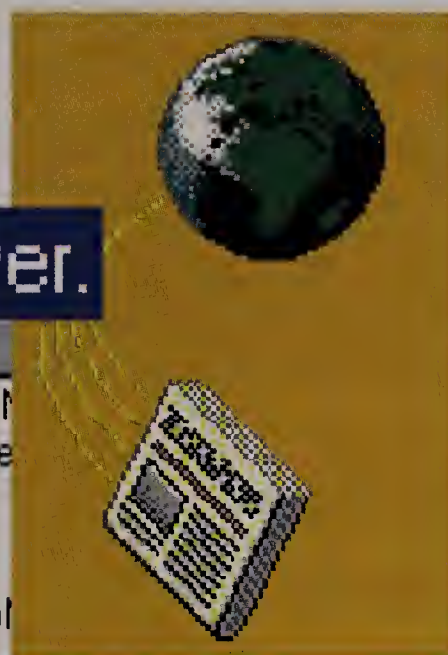
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popular Internet protocols and standards, so you can extend all this goodness to the Internet. Now ordinary individuals can set up discussion groups. Far-flung teams can begin collaborating. Users can access their mail from any standard e-mail client anywhere—even from a Web browser. In short, Microsoft Exchange, proud member of the Microsoft BackOffice™ family, gives you a comprehensive messaging and collaboration system that knows how to make the Internet perform. And that, my friends, is the best of both worlds.

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they say they are. Under its technology and society division, which analyzes electronic commerce, the W3C is studying vendor validation and digital signatures as ways to alleviate customer and corporate fears (see Emerging Technology, Page 100).

But Miller says companies should verify that their security concerns—which are often based on media accounts of independent instances of systems insecurity—are well-founded before they invest in an expensive security system they might not need. If a company provides too much security, it could slow the processing of online activity, perhaps raising costs unnecessarily, he says. “Inside companies, the Web is spreading like wildfire, but between companies, there’s a lot of serious worry and a lot of concerns about security that aren’t really rational,” he says. “If you’re going to spend half a million dollars and you’re going to spend another half-second on each transaction, you’d better be sure that you’re offering security for what’s really going to happen.”

Security is less of a problem for business-to-business EC activity, Cohen says. When working with suppliers, distributors and other business partners, companies usually can make assumptions about a user’s technology base, connectivity and response time. With consumers, the EC waters are more murky. “When you have a busi-

By looking beyond the point of sale, companies can foster ongoing sales relationships, which will increase the opportunity for future revenues.

ness-to-business relationship, usually you’re talking about a smaller number of customers and fewer transactions,” she adds. “On the business-to-consumer side, it’s the mass market. You don’t know who you’re dealing with.”

Security isn’t the only area where companies need to balance benefits with cost concerns. Companies should be aware of the pressure that electronic commerce can put on their profit margins, says David Taylor, vice president and director of business oper-



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• Electronic commerce pioneers

Sales and marketing

The Benetton Group, Ponzano Treviso, Italy

Of the 7,000 boutiques with the Benetton name in 120 countries around the world, only a few are actually owned by that company. Benetton’s worldwide computer system, operating from a centuries-old Italian villa at company headquarters near Treviso, Italy, responds quickly to changes in the fickle fashion marketplace.

In the early 1980s, when buyers for department stores purchased stock up to nine months in advance of their shelving dates, Benetton stores, with their efficient use of EDI, could order clothes in response to swift changes in customer taste and be confident that their orders would be filled quickly. Benetton’s manufacturing and distribution operations achieved that capability by making many of its clothes, such as T-shirts, without color. Minute by minute, Benetton’s computers dictated which items needed to be bathed in vats of dye, the colors matching the movement of the marketplace. Quantities were determined by up-to-the-second customer demand. Today, Benetton’s robotic warehouse stores and retrieves 30,000 boxes of garments a day.

That setup requires that cooperation between Benetton and its trading partners—suppliers and outlets—be as close as that between a champion show horse and its rider. Company management uses the phrase “world transparency” to indicate that its central computers in Italy have up-to-date knowledge of inventory levels, colors and changes in customer demand. World transparency and a just-in-time delivery system have brought The Benetton Group an annual gross profit of approximately \$1.97 billion.

—Ruth Greenberg



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ations for Gartner Group Inc. in Stamford, Conn.

"You don't want to hide behind your online marketing tool as a loss leader," he says. "This is a channel. You have to manage it as a channel."

The Internet and Web can help existing enterprises move toward virtual business and commerce models, says Robin Palmer, national partner in charge of New York-based KPMG Peat Marwick LLP's electronic commerce practice. "One of the key drivers of the Net is the open systems, interoperability and the very high standards," he says. Nevertheless, companies need to consider their back ends and legacy systems while looking to new front ends and user interfaces.

"[Electronic channels] need to be fully integrated with everything they do," he says. "This is not an alternative way of doing business. It's an add-on. That doesn't mean your existing channels go away." (See "Blueprints for the Electronic Store," Page 32.)

Cohen says EC channels might burst wide open as service providers and the companies supporting the Net's infrastructure improve bandwidth availability. While the Internet will remain, Cohen says

private enterprise will probably step in with private networks that offer different qualities of service for different pay scales. "With the Internet being the public Internet where performance is not guaranteed, there's a lot of doubt about what's going to happen," Cohen says. "If you could envision an Internet where people paid for what they got, people would pay for that premium. There's a lot of money to be made here. I think a natural shake-down is going to happen."

Beyond the Point of Sale

Students of the new school of EC, educated in part by the Net, Web and younger consumers and customers, are less intent on using tactical nuts-and-bolts piecework to enable transactions and are more concerned with strategically positioning companies

"The CIO can be the conduit and the link between what is possible and what is done." —Gordon Brooks

to build customer relationships and product branding in a global electronic market. By looking beyond the point of sale, companies can foster ongoing sales relationships, which will increase the opportunity for future revenues. "The old electronic commerce was inherently tactical in what it was trying to do," says Michael Taylor of Arthur D. Little. "We're not talking about something that is extremely tactical. The strategic opportunity is much broader."

• Electronic commerce pioneers

Customer service

Federal Express Corp., Memphis, Tenn.

In 1987, Federal Express formed a logistics, electronic commerce and catalog division to take its warehousing and distribution services into the information age. With the goal of having all of its customers online by 2000, the company offers Powership, a set of proprietary hardware-based automated shipping systems that allow organizations to place, track and bill their own FedEx orders in-house, and FedEx Ship, software that people can download to their desktops to schedule pickups, track and confirm deliveries, and print bar-code labels.

Spending \$500 million on IT development annually to help ensure 99 percent accurate package delivery is quite an investment, but much of that comes back

to FedEx—gift-wrapped in gold foil. By offering customers the tools to prepare and process their own packages without the help of a FedEx employee, the company cut its customer service calls—and costs—by 60 percent. Last year, revenues topped \$10 billion.

On the Web, where FedEx (www.fedex.com) has offered services and free software since 1994, about 18,000 users access information regarding the nearly 2.5 million packages the company ships daily. Now that FedEx offers inter-NetShip, a Net-based service that capitalizes on the customer service elements of Powership and FedEx Ship, customers can prepare shipping labels from the Web without additional software or help from FedEx customer service representatives.

—Heath Row

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Many companies are laying the groundwork for and banking on the future of one-to-one marketing and the personalization of goods and services. As information about consumers' buying habits becomes more valuable and accessible, companies will be able to tailor sales propositions electronically on a case-by-case basis, Taylor says. Except for high-end items, which still can have their place in EC activity, most marketing follows a broadcast model offline, he says. In EC, this isn't true. "You're not forced into a broadcast mechanism," he says. "What you have the opportunity to do with Internet commerce is to tailor your message to an individual customer."

Companies also can combat commercial costs such as product configuration, comparison and delivery by adding a customer service aspect to their EC activities. "Companies have a real incentive to empower their customers. They can literally drown in customer support costs," Taylor says. "If you cut down on the cycle time involved in all of your customer-facing processes, you probably need to fill orders faster than you did before. With digital goods, you can do fulfillment online."

When working with physical products as well as digital products, companies can use electronic catalogs and channels to market goods that might be too costly to maintain at store locations. Gartner's David Taylor says companies like Toys "R" Us, The Home Depot and Office Depot Inc. can increase the "floor space" of their Web stores to feature high-margin, low-turnover items like expensive, hand-crafted wooden toys, home construction supplies and windows. Those items cost retailers money if kept in stock too long. "[EC] allows the mass merchandiser to become a specialty merchandiser," Taylor says. "Virtual floor space doesn't take up as much room as physical floor space."

The Shape of Things to Come

In the virtual marketplace, widespread network access and the shift from intranets and value-added networks (VANs) to the Net and Web can take businesses in two directions. First of all, technologies like the Web can open businesses to a wider market than was accessible previously. Jordan says new channels will enable EC to help companies service or sell to the whole world while remaining aware of local cultural issues and mores. Instead of being merely multinational, companies will be truly global. While marketing to other countries might raise some logistical issues, Jordan says that doing so will help

"Commerce is about retaining legitimacy and operating in the long run. It's providing an ongoing service for customers."

—Rick Watson

• Electronic commerce pioneers

Virtual companies

Virtual Vineyards, Palo Alto, Calif.

When Robert Olson, a former Silicon Graphics Inc. manager, and Peter Granoff, wine director for a San Francisco restaurant, founded Virtual Vineyards (www.virtualvin.com) and its Palo Alto, Calif.-based parent company Net Content Inc. in January 1995, they entered the Web through the wine cellar, not the front door. Rather than move an existing business to the Web, they started an online company that sold a product—as well as expertise and information about that product. By offering wine and food products—plus Granoff's expert advice—Olson and Granoff established a virtual watering hole for sommeliers and wine enthusiasts.

As one of the first Web-only businesses, the 20-employee company was also the first retailer to use CyberCash Inc.'s secure financial transactions to conduct business online. When orders are placed, they are transferred electronically from the

companies identify which business processes can be aggregated by other enterprises and which should be narrowed and positioned as core competencies.

The second move companies will make is toward one-to-one marketing. Already that is happening online, where companies solicit demographic data from online visitors and customers, track activity with cookies and offer e-mail newsletters and updates based on user preferences. Michael Taylor says that by using IT to enable customer self-service, companies can streamline customer-facing processes, or processes in which customers have





company's headquarters to its Napa Valley warehouse, from which bottles are shipped along with tasting notes and other information via Federal Express delivery. While Virtual Vineyards is not the only wine and food shop on the Web, its emphasis on information and bargain prices has helped it age well.

Once business achieves adequate vintage, the company plans to move into electronic commerce consulting, software development and systems integration. Brad Meltzer, the company's interface and interactive database developer, designed Stretch Text, a Web publishing tool that redraws pages through a Silicon Graphics gateway to display new information without waiting for another page to load. With the potential for software spin-offs and sales reaching \$1 million last year, Olson and Granoff can afford to look at the world of wine through rosé-colored glasses. —Heath Row

one-on-one contact with employees and customer service representatives. By automating customer service functions online or using telephony, companies like Federal Express Corp. can cut their customer service costs by as much as 60 percent. Self-service carries over into other areas as well. Watson says companies can reduce customer service costs by providing an electronic forum—such as software-specific discussion areas on CompuServe and other online services—in which customers can interact with each other in a users' group-like setting (see Page 44 for details on CIO's Online Forum about electronic commerce). "If you can put customers in touch with other customers, they can solve each other's problems," he says.

Watson says individualized information will be

• Electronic commerce pioneers

Virtual companies

Amazon.com Books Inc., Seattle

Imagine roaming a bookstore with a title catalog the size of seven New York phone books. That's the shtick behind Amazon.com, the 1.1-million-title Web store with a street address in Seattle that really lives at www.amazon.com.

Founder Jeff Bezos says his bookstore that went online in July 1995 simply couldn't exist in conventional store land—which is, after all, the point. "Businesses can do things on the Web that simply cannot be done any other way," he says. For example, customers post book reviews and authors post "self-conducted interviews" that are linked to the appropriate titles. Readers search the site by author, title and subject keyword as well as browse via subject links. Once a reader has made a selection, Amazon flashes titles of similar books.

With a choice in hand, as it were, the customer enters shipping information. Books are usually sent within two or three days, though really obscure titles can take several weeks. Since Amazon doesn't order most books until after the sale is made, inventory is kept to just a few bestsellers.

Although growing at an astounding monthly rate of 34 percent, according to *Business Week*, Amazon.com has not yet encountered serious competition online. But that will obviously change. Wal-Mart Stores Inc. and Microsoft Corp. plan to offer tomes online, and it's only a matter of time before retailers such as Borders Books and Music stores and Barnes & Noble bookstores power up with competing online offerings. Still, when faced with new challenges, Bezos does have help: Any management guru's latest business book is just a few clicks away.

—Carol Hildebrand

used increasingly and that one-to-one marketing will become even more transparent and ubiquitous in the home. Watson foresees a day when the manufacturer of his refrigerator will be able to monitor how many times he opens and closes his freezer door. By tracking how often a person uses a freezer and how long the door is open each time, the manufacturer could customize its next refrigerator sales pitch to laud a more efficient model to a customer who opens his freezer door 20 times a day.

Another future, as seen by Horner, is less familiar. "The future is going to be about as strange as today would be if you took away televisions, telephones and fax machines," he says. "When we get there, we won't know that we're there." **CIO**

Staff Writer Heath Row can be reached at hrow@cio.com.

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ELECTRONIC DATA INTERCHANGE

Bob Edelman: "It's crazy to kludge the intranet with EDI."

The Once and future EDI

Electronic
COMMERCE

Reader ROI

ELECTRONIC COMMERCE is a catchy term, but for most companies, the current modality is EDI. In this article, readers will find out

- ▶ What is wrong with traditional EDI
- ▶ The pros and cons of new EDI variations
- ▶ How companies are fitting EDI and its variants into their broader electronic commerce plans

With legacy EDI software integrated with the Web and VANs offered by Internet service providers, variations on EDI will revitalize this important tool of electronic commerce

BY LYND A RADOSEVICH

For nearly three decades, electronic data interchange (EDI) has been the primary method of conducting online business-to-business commerce. They've been good years but far from perfect. EDI comprises the standards and services that allow companies' computers to perform electronic transactions such as purchase orders without human intervention. EDI is popular among large companies because it saves money that otherwise would be spent on processing paper and

ELECTRONIC DATA INTERCHANGE

rekeying data. But EDI technology remains firmly rooted in its mainframe-oriented past, and users say it can be limiting. "We've been involved in EDI for 15 years," says Bob Edelman, vice president at Marshall Industries, an electronic components distributor in El Monte, Calif. "EDI never provided the ultimate solution we wanted because of the cost of setting it up, the sophistication required to set it up, the lack of ability to do any spontaneous transactions and the lack of proliferation and connectivity to some customers."

The Internet, however, holds bright new promise for business-to-business electronic commerce. The Net offers a way to reach thousands of new suppliers and buyers who have nothing more complicated than an Internet connection and a Web browser. Also, the Internet can go far beyond EDI in terms of business communications. Companies can use the Internet to coordinate the entire purchasing cycle—from product information to customer support—as well as carry out low-level transactions such as purchase orders. The old EDI infrastructure is creaky, and the Internet is developing into a hot commerce tool—particulars that have some people composing EDI's obituary. "EDI is dead in 24 months," says William L. Schrader, chairman, president, CEO and founder of PSINet in Herndon, Va., perhaps the country's largest Internet service provider, counting 170,899 consumer wholesalers, 15,062 companies and 11,715 individuals among its customers.

Other experts acknowledge EDI's problems but say it has plenty of living yet to do. First, vendors are finding new ways to marry EDI and the Internet. And second, Internet-enabled or not, EDI's inertia



have to consider several combinations of EDI and the Internet. Trading partners can retain existing EDI connections, find cheaper ways to send EDI messages and use the Web to reach out to new partners.

Conventional EDI

EDI works by allowing different companies' computers to exchange transactions using standard formats, namely the American National Standards Institute's (ANSI's) X12 series. X12 specifies standard fields for purchase orders, shipping documents, invoices, payments and hundreds more data transactions. Typically, EDI software extracts "flat" files (files from which links to other data have been removed) from mainframe financial or order-processing systems and translates the data into EDI standard forms. Companies then transmit large batches of EDI forms over a dedicated phone line or a third-party value-added network (VAN). VANs ease the job of connecting with many trading partners by collecting forms in an electronic mailbox; sorting, translating and forwarding them to recipients; and guaranteeing that they reach their destinations intact.

Conventional EDI has a number of advantages that argue for its vitality. Large companies can dramatically decrease errors introduced in rekeying information and reduce the time and clerical costs of processing paper forms by hand. Also, EDI can help companies save money in strategic ways. For instance, large retailers like Wal-Mart Stores Inc. in Bentonville, Ark., have set up EDI-based stock-replenishment systems, in which they send sales data to suppliers and set up an automatic mechanism to reorder hot-selling items. Such systems significantly cut retailers' warehousing costs.

More evidence that EDI is alive and well: EDI



will preserve it into the foreseeable future. "Are companies with massive EDI implementations going to rip out EDI interfaces to their applications and replace everything with a new buying method and data transfer [system] that is Web-based?" asks Barbara Reilly, a product manager in the Electronic Commerce Strategies Service Gartner Group Inc. in Stamford Conn. "It's not going to happen." (See "Blueprints for the Electronic Store," Page 32.)

Instead, for the next few years at least, companies planning to conduct electronic commerce will

Joe Kokosa is not yet secure about Internet security.

standards and technologies are dependable, proven and trusted. Communications are sent on private lines that have limited exposure to the public and therefore are relatively secure. What's more, the batch transfer of flat files efficiently moves large volumes of data. Finally, established VANs, including General Electric Information Service (GEIS) and IBM Corp.'s Global Network, help take the headache out of finding trading partners and connecting to their disparate systems.

However, conventional EDI also has significant shortcomings. Companies must painstakingly link their back-office systems to EDI software, then synchronize protocols with their trading partners' systems. The rigid and complex X12 formats don't jibe well with new applications. Although the batch transfer process moves large chunks of data efficiently, it is a time-delayed process, increasingly at odds with today's real-time world. Also, transmission charges are expensive. VANs typically charge \$25 to transmit 1,000 characters, according to experts, although some VANs are now lowering their prices. "We have many customers using traditional VAN services that spend \$40,000 to \$60,000 per month just sending regular [purchase orders] and invoices," says Steve Botts, director of Templar product management at Premenos Corp., an EDI software company in Concord, Calif. The companies range in size, he says, but some of them aren't very large.

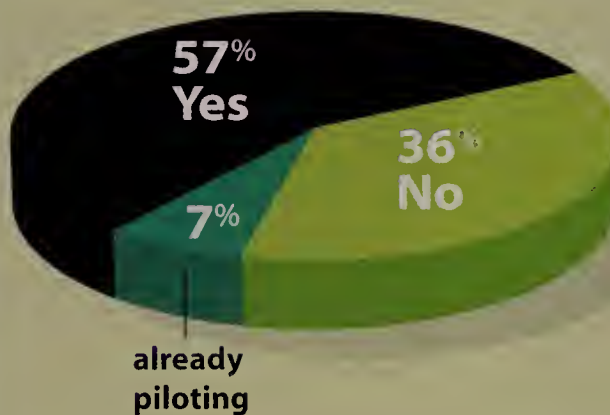
Despite the costs, EDI can be extraordinarily cost-effective for very large companies such as Sears, Roebuck and Co., Wal-Mart and General Motors Corp., which act as hubs for their thousands of suppliers. However, the suppliers, or "spokes" in EDI parlance, don't necessarily see the same benefits. Not that they need to; if spokes don't submit to hubs' demands to conduct business by

EDI, they lose the business. Dana Corp., an automobile parts manufacturer in Auburn, Ind., has been using EDI since the early 1980s, when Ford Motor Co. and GM mandated it, according to Joe Kokosa, an EDI administration manager in the Spicer Clutch division. Dana's EDI system talks directly to mainframes at GM and Ford via telephone lines or to other customers' EDI systems through VANs. Either way, the transmission charges are expensive, but the returns to Dana remain unmeasured. "We were required to do it, so calculating how much we were saving or not saving was not a 'value-added' activity," says Kokosa.

Will they can the VAN?

Substituting the Internet for a value-added network provider can significantly cut a company's EDI transmission costs. Two questions reveal the trend:

"Are you looking at EDI on the Internet?"
(respondents: 30 large companies)



"If you're not yet piloting internet-based EDI, why not?"
(multiple responses allowed)

68% Need to work out security

50% The Internet is not yet reliable enough

21% We're waiting for trading partners to ask us

18% Traditional EDI is good enough

SOURCE: "WILL THE WEB KILL EDI?" A 1996 SURVEY BY FORRESTER RESEARCH INC. OF CAMBRIDGE, MASS.

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Has It Changed Your Life Yet?

A related problem with traditional EDI is its rigidity. Many companies' business models call for increasing their customer and supplier bases. But setting up an EDI link requires so much time and money that it keeps the numbers of electronic partners in check.

For those reasons, EDI participation has remained relatively limited. Blane Erwin, an analyst at Forrester Research Inc. in Cambridge, Mass., estimates that roughly 100,000 U.S. companies currently use some form of EDI. That's only a fraction of the 2 million companies with 10 or more employees that *could* be using electronic commerce.

EDI Via the Internet

In the past year, the Internet, once heralded as EDI's executioner, has given EDI users a new option to consider. Rather than sending X12 forms back and forth via VANs, companies can use products such as Premenos's Templar to send EDI transactions over the Internet. Templar puts transactions into encrypted envelopes and electronically seals them so that only parties privy to the encryption key can view the contents. Those envelopes can then be sent securely

**Ron Morosetti
sees big savings
in conducting EDI
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over the public access Internet rather than over privately owned VANs or dial-up connections.

Substituting the Internet for a VAN can dramatically lower EDI transmission costs. Chevron Corp. of San Francisco forks over \$1,200 to its VAN each time it sends a quarterly petroleum production report to the U.S. government, says Ron Morosetti, a corporate EDI coordinator in Chevron's San Ramon, Calif., data center. The company is piloting a Templar application that sends the petroleum report (and will eventually send other reports) over the Internet. Chevron already has an Internet connection with unlimited access for roughly \$2,000 per month, so sending EDI reports costs nothing extra.

"EDI over the Internet offers us tremendous potential for savings," Morosetti says.

In addition, EDI over the Internet can be faster than over VANs. When companies send EDI messages by VANs, the messages are stored in electronic mailboxes until the next processing step. Also, companies generally send EDI transmissions in large, infrequent batches because VANs charge less to send big loads during off-peak hours. Morosetti says it can take between 30 minutes and two hours to send a report over a VAN. In contrast, because there's no access charge for the Internet, companies can set up Internet-based EDI systems to check their boxes more frequently. In Chevron's pilot system, EDI transmissions over the Internet generally take 10 minutes, Morosetti says.

Also, it can be easier to attract new partners to EDI conducted over the Internet than to EDI conducted over VANs. "We have a whole category of potential trading partners—mom-and-pop shops—that all have connections to the Internet, but I can't get them to do EDI, because they don't want to take on the cost of the VAN," Morosetti says. "This is a great opportunity for them."

Still, EDI via the Internet raises security questions in many managers' minds. Using the security mechanism known as public key encryption, Templar addresses the primary concerns—confidentiality, authentication, data integrity and nonrepudiation of origin and return (meaning you can't deny having received or having sent a transaction). Public key encryption is secure enough for some EDI managers, but others remain unsure. "I haven't quite bought into it yet," says Kokosa, speaking of the security of EDI over the Internet. (See *Emerging Technology*, Page 100.)

Another limitation with EDI conducted over the Internet is that the required software is proprietary:

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The big buzz

The largest Web commerce arrangement is downright shocking

Everyone's talking about big-business commerce on the Web. Now there's a big-bucks example proponents can point to. Beginning in January 1997, more than 250 electric utilities plan to conduct \$25 billion to \$50 billion worth of business per year with each other over the Internet. The utilities call their initiative the Open Access Same Time Information Systems (OASIS).

OASIS is a semiprivate version of the Web (known as a virtual private network) that enables brokers to schedule transmission capacity across different utilities' grids. Say a steel company in Pittsburgh needs electricity. Thanks to federally mandated deregulation, it can buy the power from wherever it's cheapest—an Oklahoma generation plant, for example. To move the electricity from Oklahoma to Pittsburgh, independent brokers arrange to purchase excess transmission capacity from utilities that lie in between. Currently, brokers

make arrangements by phone or fax, and their success reportedly depends on having connections with "power" players.

To level that business playing field, the Federal Energy Regulatory Commission said the utilities must make information on extra transmission capacity available on an open network and permit all brokers to reserve transmission capacity online. The utilities then gathered into groups of 10 to 15 facilities, and each group is building a Web site to do just that. "The Web is the natural choice for the network because the Feds can't mandate use of proprietary technologies," says Jeff Geltz, director of information services for New England Power Co. in Westboro, Mass. Geltz also chairs OASIS for the New England Power Pool (NEPOOL) OASIS development team and co-chairs J-TSIN, the Joint Transmission Services Information Network, to which 70 percent of these companies belong.

However, with sensitive information and valuable transactions zipping across the Internet, the utilities want to make certain nothing goes awry. That's where the necessity for a virtual private network comes in. TradeWave Corp. in Austin, Texas, manages OASIS security using public key encryption and certification to guarantee that only authorized people use the Web sites.

The security, which assures that the people using the keys are who they say they are, is administered by IBM Corp. "It's a way to provide tight security in a distributed environment using a trusted third party," says Alexander Cavelli, vice president of strategic development for TradeWave. The virtual private network model, he adds, is relevant to any vertical industry whose members trade heavily among themselves.

—L. Radosevich

Trading partners need the same package at both ends. Companies must install the same software and coordinate their upgrade cycles, which inhibits spontaneous commerce. EDI vendors are working to make their systems compatible, and the Internet Task Force is creating requirements for EDI-over-Internet standards, but those efforts take time. Furthermore, companies are limited to rigid EDI formats.

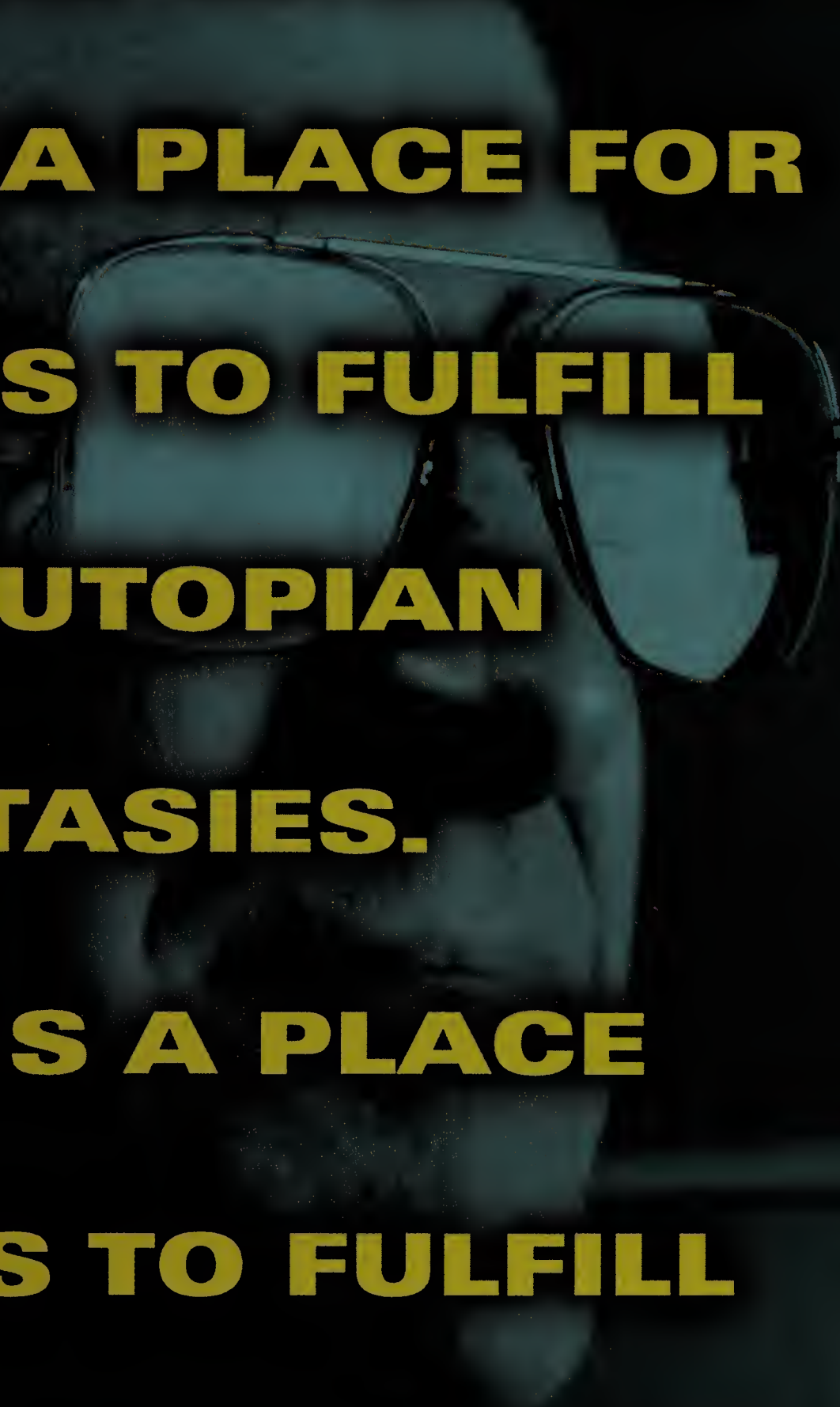
EDI Plus the Web

Internet commerce fans argue that whether data is sent over the Internet or a VAN, EDI alone misses the broader electronic commerce picture. Much happens before buyers and sellers are ready to exchange purchase orders and bills, and EDI doesn't address any of it. "If you take the pure EDI stream that runs over private networks and just run it over the Internet, you don't gain much," says

Tom Patterson, chief strategist for electronic commerce at IBM Corp. in Falls Church, Va.

Not surprisingly, he recommends that companies use a service such as IBM CommercePoint, which combines standard EDI formats with Web-based software. Companies can use their Web site to attract trading partners, exchange information and take orders; then they can link the Web site to back-end order-processing and financial systems via EDI.

Some forward-thinking companies already are moving in this direction. Since January 1996, AMP Inc., an electronic components manufacturer in Harrisburg, Pa., has offered an electronic catalog on the Web that now lists 80,000 parts. The site includes computer-aided design drawings of the parts that customers can download and use in their own designs. The catalog, which was built using software from Saqqara Systems Inc. Systems Inc. in



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ELECTRONIC DATA INTERCHANGE

Sunnyvale, Calif., is helping AMP reach roughly 200 new high-tech customers per day, and it should save money. "Each year, AMP spends \$7 million to \$10 million on printing paper catalogs that keep track of the hundreds of thousands of products we manufacture worldwide," says Jim Kessler, direc-

tor of global electronic commerce at AMP. "We've figured that we can save upward of half a million dollars by using the electronic catalog along with a fax-back system as an adjunct to paper catalogs."

Next, AMP plans to link the catalog to its back-end systems so that the entire sales-to-delivery process is automated. Kessler has yet to decide whether EDI will be the linking mechanism, because there are a couple

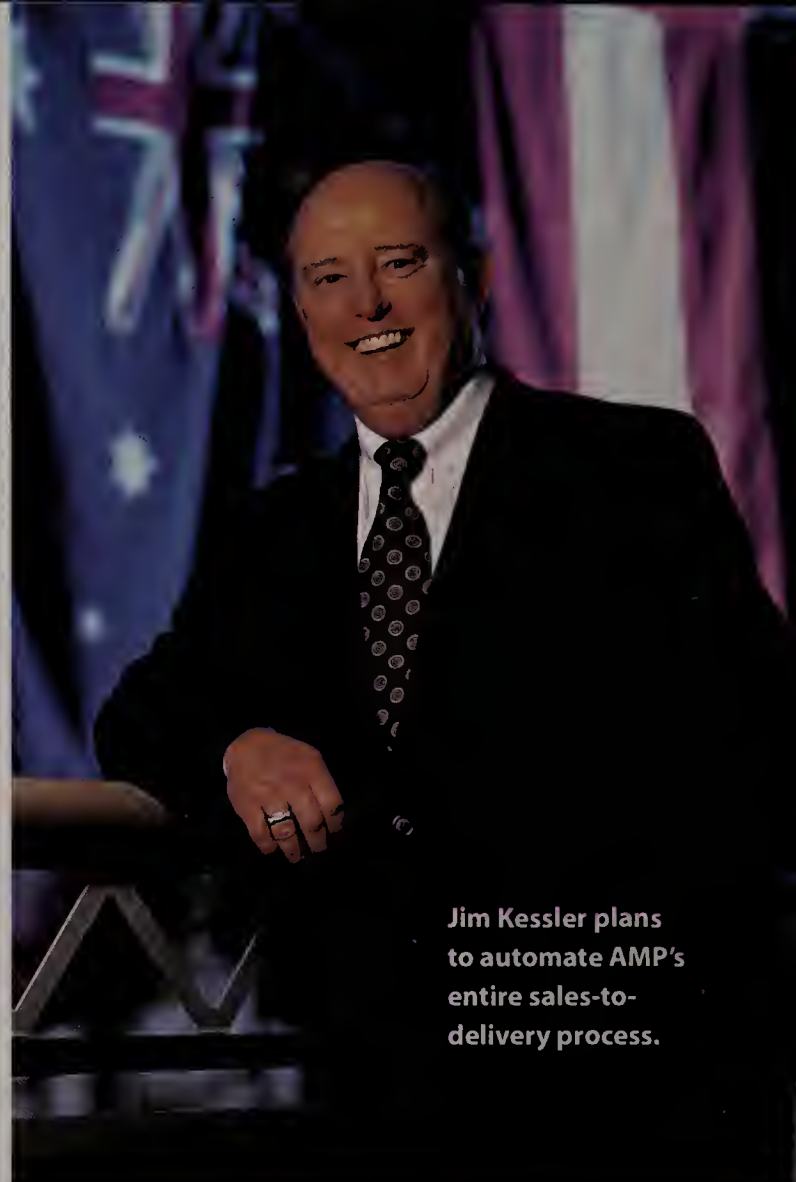
of attractive solutions. Together with Saqqara and Cambridge, Mass.-based Open Market Inc., he is running a pilot project to analyze the alternatives. For example, Open Market's transaction server connects to the Saqqara catalog software on one end, and it could generate standard EDI messages on the other end. Since AMP already has EDI translators in place, it could receive and process the EDI orders. Or Open Market could build custom links directly to packaged applications from SAP AG, Oracle Corp. and PeopleSoft Inc. Finally, Open Market's server could connect to mainframe systems via a terminal emulation server. AMP has created a division (AMPeMerce,

a consulting program that AMP markets to other companies) that will sell the resulting systems to the public, so the outcome of the current debate about possible configurations is crucial. "The question is, do you get the Web server to send an EDI message, or do you connect to the mainframe?" asks Sherif Danish, Chairman and CEO of Saqqara Systems. The answers, he notes, are not yet clear.

Extended Intranets

Some managers don't see any role for EDI in their new electronic commerce systems. They believe it's just too outmoded for today's fast-moving business world. So rather than link companies by EDI, they are letting a select group of customers through the firewall into the corporate intranet where they conduct business.

At Marshall Industries, customers receive alphanumeric IDs and passwords to MarshallNet, Marshall's intranet. Once inside, they see a customized screen that displays prices, inventory status and



Jim Kessler plans to automate AMP's entire sales-to-delivery process.

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Still Kicking

EDI is just the most recent addition to a venerable list of items that have outlived pundits' prophecies of imminent demise, including

- Mainframes
- Analog anything
- Text-based interfaces
- Commuting
- Wang Laboratories Inc., Digital Equipment Corp. and Bull Electronics
- Human agents
- Live meetings
- Shrink-wrapped software
- Fax machines
- Paper

—L. Radosevich

other information that they would traditionally obtain by paper, EDI or some other time-delayed means. Also, they immediately can place orders, and eventually they'll be able to set up bank transfers for payments, Marshall's Edelman says. Why not use EDI for the transactions? "It's crazy to kludge [the intranet] with EDI. I mean, why put everything in a box and wait till you pick it up when you can have it in almost real-time?" he asks. "Information cycle times have shrunk so much that people need to have information instantaneously to remain competitive."

The benefits of conducting business over extended intranets include convenience—customers can get the information they need right away—and partnership building. In addition, extended intranets are more flexible, responsive and comprehensive than traditional EDI. For instance, customers and salespeople can exchange personal messages as well as business information, no small advantage in an age when relationship building is key to swelling revenue streams. And an extended intranet is more secure than a Web site on the public Internet because information is protected behind firewalls. However, the lack of transaction standards for extended intranets means that buyers have to log in separately to each vendor's intranet, and it remains unclear how customers can link their own systems to save work on their end.

What is Needed

New standard transaction sets that aren't as complex as X12 will allow electronic commerce to work more smoothly, experts say. "Rather than continue to exchange unreadable X12 formats and deal with

individual proprietary encoder/decoders, it would be better to develop data interchange standards for HTML and e-mail standards that are suitable for both people and machines," says Carl Hage, president of C. Hage Associates, a consulting company in Sunnyvale, Calif. The standards could evolve from existing X12 formats, but they should be humanized for the Internet world. EDI was created to enable mainframes from one company to talk to mainframes at another company; but on the Internet, mainframes, PCs and humans all must be able to read the forms, Hage explains.

What's more, companies will need assured bandwidth and security if they are going to rely on the Internet for sending business transactions. To meet that demand, experts predict, VANs and Internet service providers (ISPs) will jockey to provide private subnetworks that are accessible through the Internet. Vendors already are offering early versions of such systems. For instance, GEIS offers GE TradeWeb, a Web browser front end for its existing VAN service. In contrast, PSINet's intranet service, PSI IntraNet, uses Internet protocols but routes intranet customers' packets separately from public Internet packets for better performance and security. Whether it's a VAN or an ISP, what's

important is that a reliable third party guarantees the pipes are available, says Botts.

Ultimately, companies will have to deal with several variants of EDI and Web commerce while the electronic marketplace sorts itself out. Meanwhile, organizations shouldn't get so star-struck by the technologies that they abandon the business knowledge gained by years of operating EDI. Unfortunately, that tends to be the case. Internet and EDI people generally are in different groups within a company. "It's a big problem," says Reilly. Companies should involve the EDI folks in the thinking process, she says. "They're the ones who understand the business processes that exist in the trading community at this point in time. If the Web is going to augment those processes or, in some cases, significantly change them, you really have to understand what they are." **CIO**

Lynda Radosevich is a freelance writer based in New York. She can be reached at lradossev@interserv.com.



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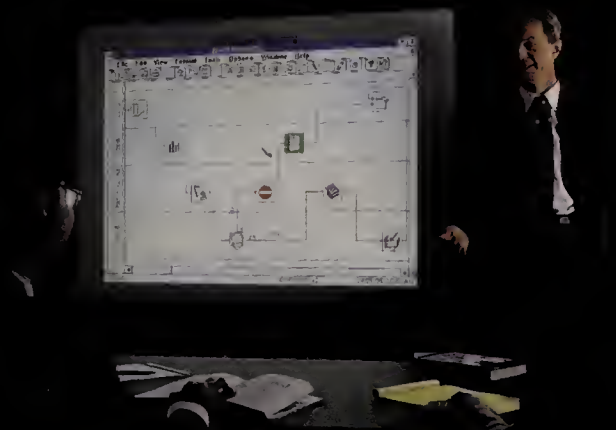
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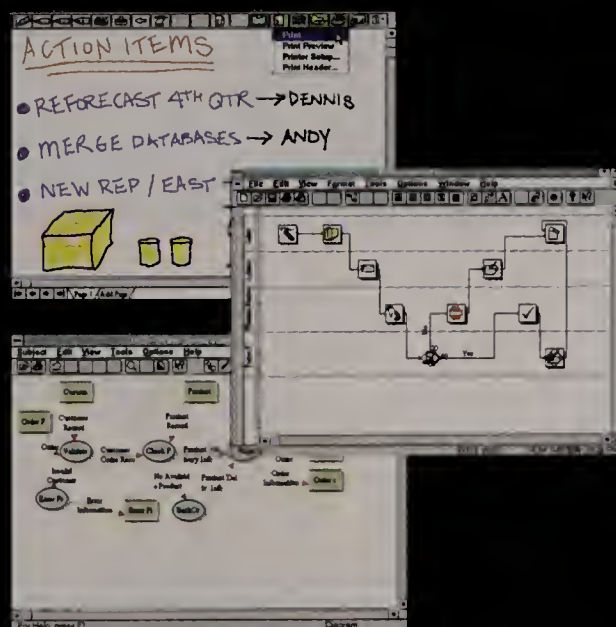
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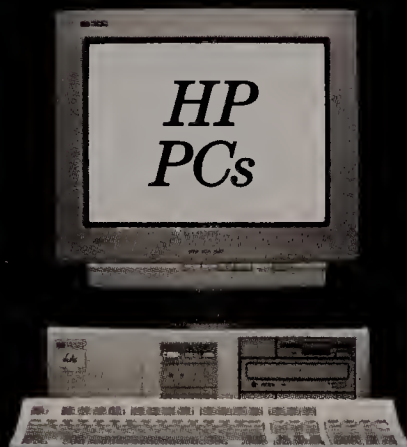
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Sticking with strategy

The company that brought us Scotch tape and Post-it Notes is known for innovative products. But when it comes to engaging in electronic commerce, the manufacturing giant is sticking with a straightforward strategy: Make sure each initiative supports business goals.

BY DEREK SLATER

At 3M's Maplewood, Minn., headquarters, a road sign for the information superhighway points directly to the office of Jim Radford, 3M's webmaster and manager of interactive customer communications. Radford—who has a certificate commemorating the company's "First Internet Order" prominently framed above his gargantuan monitor—fires up his Web browser and logs into The Innovation Network, www.mmm.com. First he surfs

Reader ROI

THIS ARTICLE DETAILS HOW A single company is meeting the technical and practical challenges of implementing an ever-expanding EC portfolio. The reader will learn how 3M is

- ▶ Expanding its EDI capabilities
- ▶ Creating electronic catalogs
- ▶ Using one-to-one marketing
- ▶ Exploring Web-based direct selling
- ▶ Enhancing customer service

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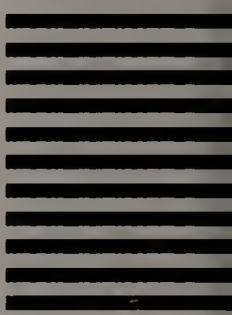
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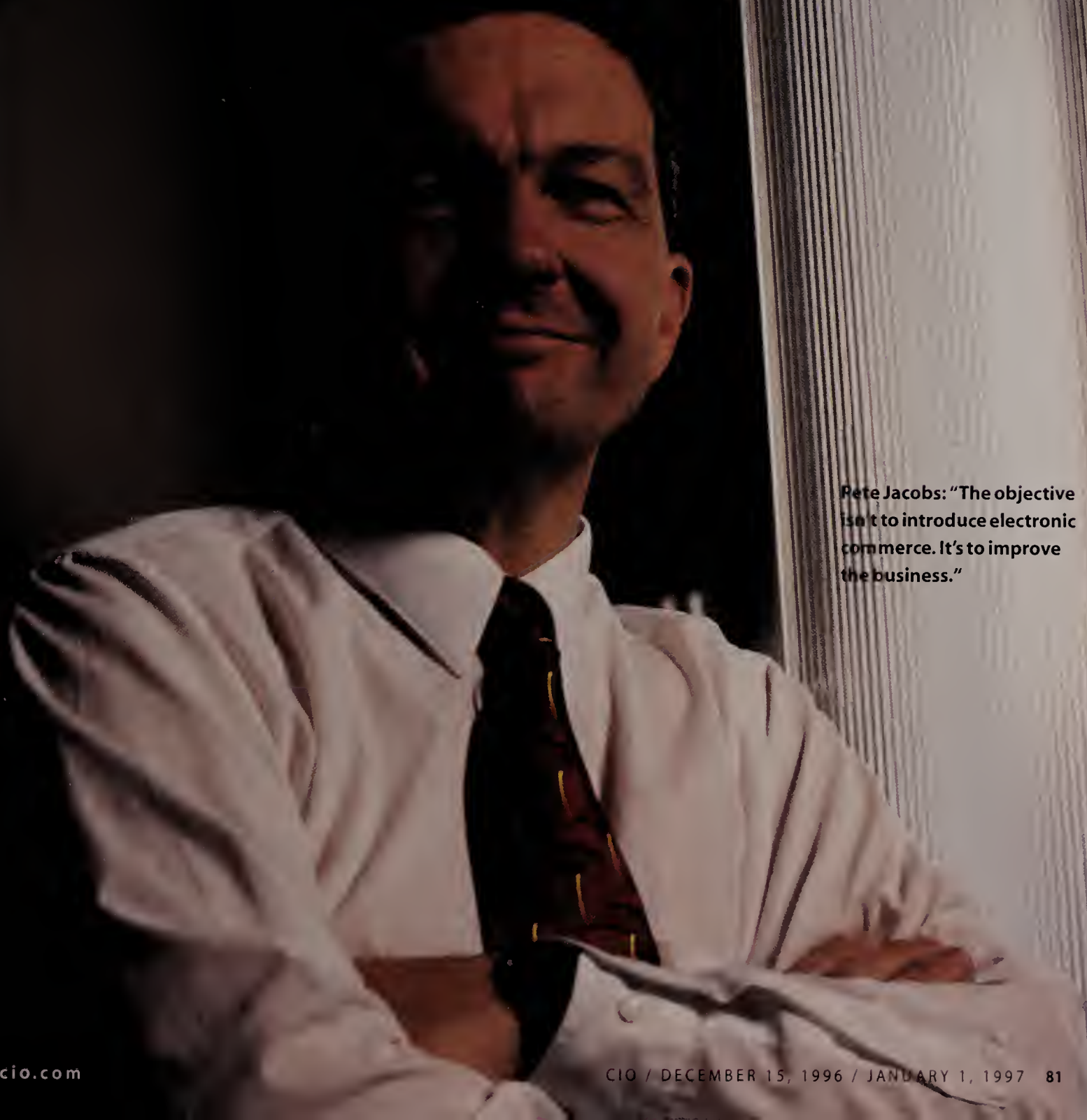
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Electronic COMMERCE



Pete Jacobs: "The objective isn't to introduce electronic commerce. It's to improve the business."



Jim Radford: "Electronic catalogs are our number-one problem. They're not doing what we want. They are not rich enough, not deep enough, not fat enough."



through the flamboyantly graphical 3M *Buf-Puf Products: The Teen Webzine for Health and Beauty* (sample articles: "Meet the Guys Who Eat Buf-Puf Sponges" and "Quiz: RU a Grrl, Geek or Groupie?"). Then, returning to the home page, he clicks into a buttoned-down set of pages describing 3M's new MP8030 Multimedia Projector. Beyond giving Radford a quick way to show off 3M's wildly diverse product lines, the company's Web site represents just one way 3M is delving into electronic commerce (EC) to serve its equally diverse customer base.

Although 3M's first electronic commerce ventures sprang from the manufacturer's innovative corporate culture, nowadays EC initiatives at 3M are deliberate and strategic. The company is pushing three key initiatives to drive growth: accelerate new product development and commercialization, encourage supply chain excellence and build customer loyalty. Recognizing EC technology's potential for advancing the latter two business strategies, Staff Vice President for IT David Drew and his IS staff have elevated EC to a top-three priority on the IT docket. Today, every major EC initiative at 3M is linked to streamlining the supply chain and/or winning customers by simplifying the

buying process. "The objective isn't to introduce electronic commerce. It's to improve the business," says Pete Jacobs, 3M's manager of electronic commerce.

As more communications technologies and platforms have emerged over the past few years, 3M has gradually expanded its definition of electronic commerce to embrace them. The company's first ventures into EC were strictly business-to-business EDI transactions; now the portfolio of EC initiatives includes

electronic catalogs, direct sales and customer service via the Web as well as a fax-on-demand service. "We're expanding from a focus mainly on the transactional side...to the electronic marketplace in its broader sense," says Jacobs.

The "transactional side" of EC essentially means electronic data interchange, the starting point for electronic commerce at 3M. EDI made its way into 3M in piecemeal fashion

• A history of innovation •

3M's emphasis on innovation is well known. Over the years, the company has grown from essentially a zero-product company (it was founded as Minnesota Mining and Manufacturing Co. to work mines that quickly tanked out) through its first success (waterproof sandpaper) into a diverse giant with more than 60,000 products. A perpetual corporate goal is that 30 percent of 3M's revenues be generated by products introduced within the past four years. However, the company recognizes that great ideas alone do not a great corporation make. In each market it serves, 3M aims to be the preferred supplier. So along with its innovation obsession, 3M focuses on achieving supply chain excellence and building customer loyalty.

PHOTOGRAPHY BY STEVE WOIT

more than a dozen years ago as a means of eliminating paperwork, reducing labor through automation of reports and speeding purchase order processing. While some others may be sounding the death knell for EDI (see "The Once And Future EDI," Page 66), it is still very

customers—and sends about 65 percent of its purchase orders to suppliers—using EDI. In addition to offering all trading partners regular automated reports, 3M encourages customers to log into InfoMyWay, its Web-based ad hoc order tracking application, at any time

"Everyone pooh-poohs fax as an ancient technology, but it's still the most common choice for our customers." —Pete Jacobs

much a vital part of 3M's business: The company uses it to exchange information with more than 2,000 U.S.-based trading partners. (Roughly 1,100 of these are suppliers to 3M; 800 more are business customers or distributors. The remainder are financial institutions and transportation carriers.) The number of partners continues to grow, and transaction volume is increasing by about 20 percent per year.

3M uses EDI for order status checking as well as to conduct electronic fund transfers, facilitate vendor-managed inventory and send advance ship notices. In the United States, the company receives more than 30 percent of its purchase orders from

to pinpoint when shipments from 3M will reach their docks. That streamlines customers' receiving processes and in many cases allows them to automate the check-in of newly arrived inventory.

3M conducts EDI transactions via virtually any method its customers request,

David Drew: "Develop the capability to do things. You don't have to be right about everything."

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including VANs and direct connection and, more recently, the Internet. The company views its have-it-your-way philosophy as a means to build customer loyalty. Different customers and suppliers have varying levels of technical sophistication: While some receive and reuse electronic EDI data, others simply want a hard-copy status report waiting in their mailboxes each morning. In fact, the unglamorous fax remains the dominant order-status report medium. 3M automatically faxes reports to about 3,000 customer locations; about 1,500 receive online updates.

"As more companies order merchandise over the Web, order sizes are going to get smaller. There's very little mention of how you're going to fulfill those orders." —Pete Jacobs

"Everyone pooh-poohs fax as an ancient technology, but it's still the most common choice for our customers," says Jacobs. That may finally change if the Internet continues to build momentum. After extensive pilot work with some of its largest trading partners, 3M's first half-dozen Net-based automatic EDI accounts went live in late 1996; Jacobs says he expects that number to rise quickly.

"EDI helps [us become] a preferred supplier," says Denny Sullivan, channel logistics manager for grocery and commercial products in 3M's consumer and office markets group. "Today it's a really important part of our total sales and

marketing mix. There are only so many spaces on a grocery shelf, and there's tremendous competition for those spaces." Reducing its customers' inventory and paperwork makes 3M a more attractive candidate for that shelf space, Sullivan says; indeed, he looks to all of 3M's EC efforts as the primary weapon for improving the mechanics of the product supply chain. "EC is the most important enabler we have to drive process improvement," he says.

EDI spawned the beginning of EC at 3M, but it is by no means the end. Electronic catalogs have emerged as a vital EC initiative for winning customers. Although 3M doesn't offer direct electronic sales of the products—no transaction capabilities are built in—electronic catalogs do provide useful purchasing information. Radford gives an example: "Say a guy wants tape that adheres to metal at 30 degrees below zero for an industrial application. Which kind of tape is it?" Enabling customers to search for relevant product specs online can make it much easier for them to find the right answer quickly. It also frees 3M's customer support personnel from answering basic questions so that they can focus on activities that add value.

3M provides electronic catalog information to a variety of distributors and

customers, such as the federal government's General Services Administration, which maintains a central catalog for use by its various departments. The company transmits up-to-date product and price information for the GSA catalog via its existing EDI communications pipeline. However, the Web is rapidly emerging as a key platform for publishing product information, in part because its reach extends beyond distributors to consumers and business customers themselves.

Posting product information might seem a simple matter. Not so. "Electronic catalogs are our number-one problem. They're not doing what we want. They

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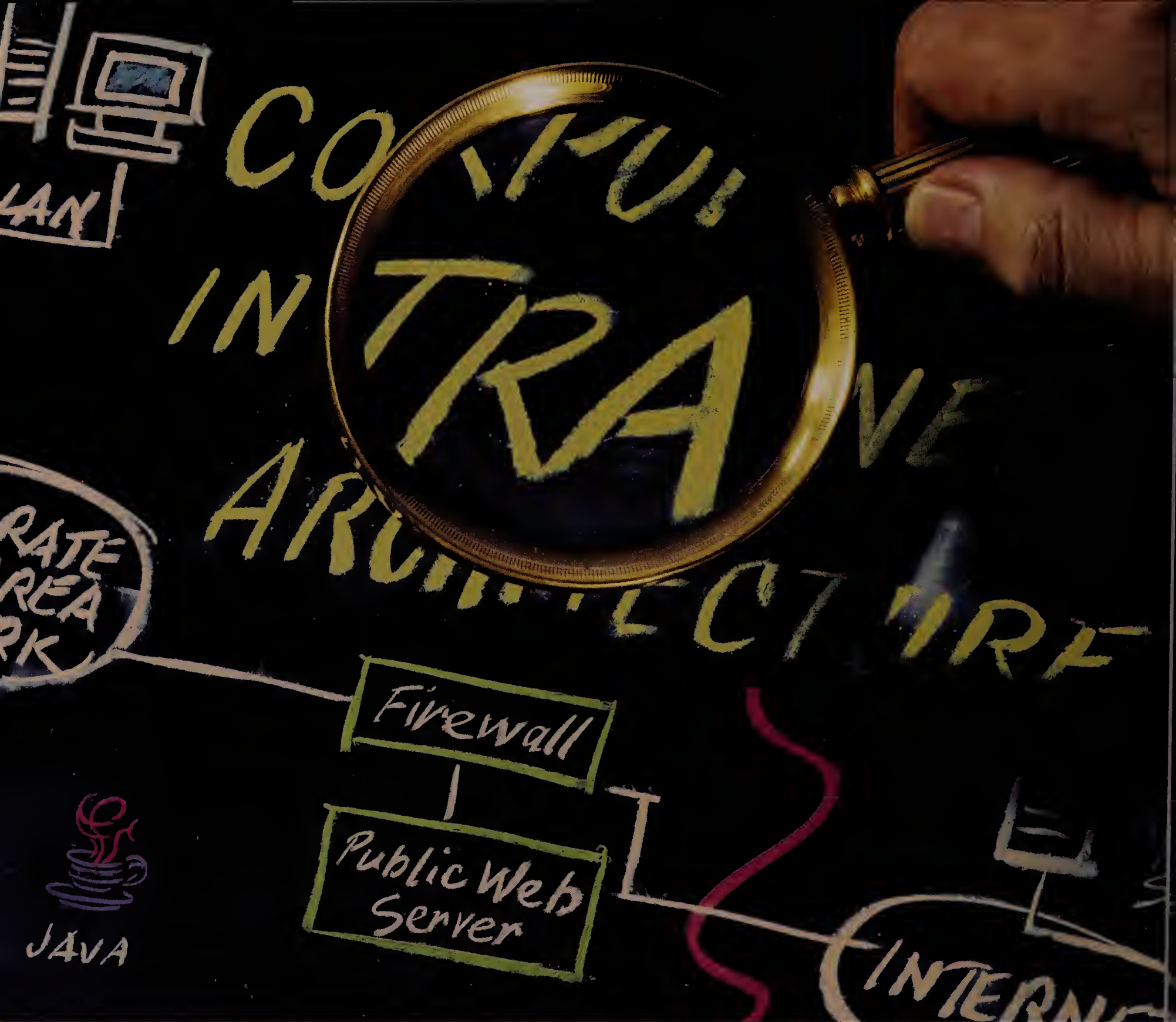
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Lessons Learned

EC wisdom from the trenches

Six months ago, 3M Staff Vice President for IT David Drew's conversations about electronic commerce focused on Internet security shortcomings. Nowadays, 3M's sockets are relatively secure and network traffic overload is the conversation du jour. EC technology runs fast—even by the computing industry's hyperactive standards. That leads Drew to EC Lesson One: Avoid development projects that require long gestation periods. The results may be obsolete before they ever get out of the starting gate.

Lesson Two is more comforting: There is room for error. While Drew notes that infrastructure decisions should be based on standards as much as possible, he also says individual applications are generally inexpensive enough to allow for some missteps. "Develop the capability to do things. You don't have to be right about everything," he says. The direct Web sales of 3M's Precise Mousing Surface, for example, are intended more to test the technology and find out about buyer behavior than to establish a key distribution channel.

According to Pete Jacobs, 3M's manager of electronic commerce, Lesson Three is to always keep the focus on achieving business goals. "We try to be a fast follower on the technology side. Where we want to be leaders is on the business side," he says. "It's not that the technology issues aren't difficult or consequential, but they get solved over time."

—D. Slater

are not rich enough, not deep enough, not fat enough," says Radford. One challenge with electronic catalogs is to provide detailed product data that's easy to sift through. While each market center is responsible for building its own Web pages, those pages must conform to companywide navigation and corporate identity standards. Another challenge is to keep product information in synch on the

multiple electronic versions. To solve that problem, 3M is building back-end product data repositories that the business units will fill and update; the EC group will then draw on those sources to provide catalog data.

Electronic catalogs are well worth the effort to produce because they offer new marketing opportunities among customers who buy from several different 3M business units. For example, hospitals typically need surgical products from the health-care division as well as cleaning supplies made by the consumer goods division. "Traditionally, those have been two very different channels," says Jacobs. By creating an electronic catalog that combines products from each of those two market centers,



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PROFILE: 3M

3M hopes to enable one-stop shopping that will earn customers' loyalty. The consolidated product data repositories will allow 3M to build a variety of marketing catalogs with a single point of input from the market centers.

Some of 3M's market centers are further along the EC curve than others, depending largely on the industry each serves. A market center usually gets involved "when the industry [it sells to] begins to adopt these electronic channels. We're serving some market channels where people aren't even thinking about this stuff," Jacobs says. In industries that are somewhat behind technologically, 3M applies its experience and assumes a leadership role by participating in industry-specific associations and through conversations with business customers. However, Drew explains that IS has not tried to dictate a single EC plan or pace for the whole company. "Instead we introduced a planning function to ensure that every division has its own plan," he says. The central EC department, which falls under Drew's purview, coordinates those plans and helps the business units stay in step with the overall corporate direction (see "How EC Evolved at 3M," at right).

Extending the idea of customized cata-

Evolution of Theory

How EC evolved at 3M

It's no surprise that electronic commerce started out as a set of disjointed EDI efforts with individual suppliers at 3M. After all, the corporate culture encourages sending employees off in different directions to innovate. Over time, though, 3M's perspective on EC has morphed considerably, from viewing it as a logistical func-

tion to considering it a strategic tool.

"EC has evolved from a process that a few accounts were developing to a strategic initiative 3M has embraced," says Denny Sullivan, channel logistics manager for grocery and commercial products in 3M's consumer and office markets group. As the number of EDI implementations grew, so did 3M's

3M is exploring one-to-one marketing because just as a hospital buys both surgical drapes and cleaning supplies, explains Drew, you might "have a doctor who buys medical supplies, and you also discover that he has a sailboat and is interested in buying products for that. Once he logs on, instead of making him wade through 15,000 Web pages, you greet him with a page of only those products he's interested in." If 3M saves customers' time by offering product information targeted to their specific wants and needs at the outset, they are more likely to do business with 3M.

One obstacle that remains before 3M can roll out one-to-one marketing lies in the difficulty of collecting the customer data, storing and analyzing it, and automating output of targeted Web pages for repeat visitors to 3M's Web site. Ultimately, 3M may send consumers multimedia e-mail aimed at their specific online profiles rather than wait for them to surf to the Web site. Such proactive marketing holds promise, although 3M, like every other company, still needs to

"figure out how to do this without bugging [the consumer]," says Jacobs.

Direct selling to consumers over the Web necessitates overcoming a different set of hurdles. 3M is experimenting with offering two computer-related products on the Web: the Precise Mousing Surface and Post-it Software Notes. The early results have proved surprising in some ways. For instance, conventional wisdom says consumers are still reticent to send a credit card number over the Web, so 3M, like many other Web merchants, offers an 800 number as an alternative payment method. Yet 75 percent or more of the transactions have been submitted over the Web using Netscape Communications Corp.'s Secure Commerce Server. That seems encouraging for Web sales, though Jacobs speculates that it represents an unusually technically savvy customer base. In other words, Web-based sales of reflective traffic vests might not produce the same results as have those computer-related products. Web-based sales of both items have been brisk, according to Jacobs, though the company won't reveal sales numbers.

Regardless, 3M is wary of several other problems with Web-based selling. One is simply that it circumvents many



logs to increasingly specific target markets leads inevitably to one-to-one marketing, in which marketing is tailored to each consumer. Indeed, as the current set of business challenges are gradually met, Jacobs expects 3M's EC focus to move beyond business-to-business to deal more directly with consumers. Already 3M is piloting several such efforts, including one-to-one marketing based on customer data gathered online and direct selling over the Internet, mostly through channel partners who also have Web sites.

organizational support. EC became a center of excellence and has grown into a full-fledged department within the IS group. According to David Drew, staff vice president for IT, the company has been consistently adding to EC resource allocations for about five years. Approximately 50 employees work in the EC department, headed by Jacobs; their to-do lists include EDI implementations, management of the EDI gateway, development of Internet and intranet applications, and consulting with the business units. In addition, many IS workers outside the EC department handle technologies vital to EC.

The individual business units are responsible for applying EC capabilities smartly. "You have to make sure you have common objectives with [trading partners]. If the customer isn't really ready for that, we're really just adding more work for them," Drew

notes. For example, if a customer asks for advance notice of when products will ship but can't put that information to good use, providing such data isn't worth the bother to 3M or the customer.

Meanwhile, the evolution of EC from logistical to strategic is also reflected in the makeup of the committees who guide the EC group. "We've had various forms of EC steering committees. The emphasis has been on the logistics function and the IT function; the next version will have much more of a marketing focus," says Jacobs. 3M's definition of electronic commerce now "includes a strong information flow component," he says.

—D. Slater

of 3M's established distribution routes, which carries a host of implications. For one thing, distributor relationships are vital to 3M and cannot be discarded casually. In addition, direct electronic sales to the consumer tend to mean lower product volumes. 3M is accustomed to selling products by the crate or carton, not in ones and twos. Shipping in smaller quantities is more expensive and creates more overhead for 3M. "As more companies do this, order sizes are going to get smaller," says Jacobs. "There's very little mention of how you're going to fulfill those orders." Every day, 3M's Web site gets hits and e-mail from an average of 50 countries ranging from Canada to Kazakhstan. Shipping a single mouse pad to the former Soviet Union is possible but may eat up the potential profit from the sale.

Jacobs expects solutions to emerge—though not from within 3M. Instead, distribution experts—such as Federal Express Corp., which has expressed interest in electronic commerce—are more likely to create solutions for order fulfillment. "You hear a lot of talk about disintermediation, about distributors going away. I don't think that's going to happen," says Jacobs. "Instead you'll see

a shift in responsibilities in the channels. In terms of fulfilling small orders, you probably aren't going to see large manufacturers like 3M doing that."

While fulfilling orders to the distant reaches of the Internet remains tricky, the Web is an excellent tool for provid-

Every day, 3M's Web site gets hits and e-mail from an average of 50 countries ranging from Canada to Kazakhstan. Shipping a single mouse pad to the former Soviet Union is possible, but may eat up the potential profit from the sale.

ing customer service in those locales. 3M takes customer service questions via e-mail through the Web site; the messages are dumped into a single Lotus Notes database, where a central worker manually forwards them to the appropriate business unit. But Radford says consumer expectations are extremely high for Web-based customer service. "They aren't impressed if it takes you a day to get back to them. To make an impression, you have to get back to them in the same hour," he says. Right now, 3M promises turnaround of 48

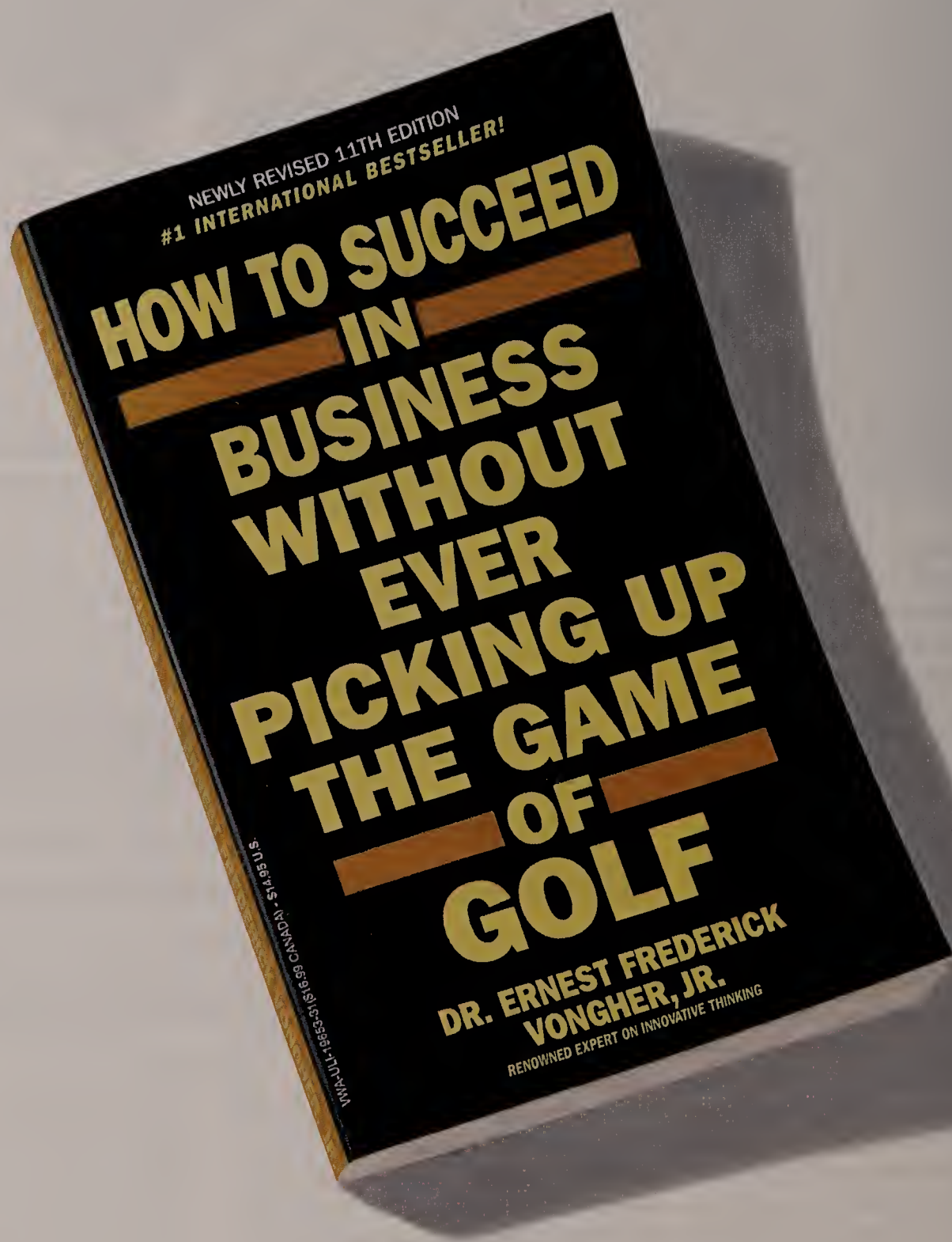
hours or less. Jacobs expects to shorten the time eventually, though the company has not set formal targets.

EC presents 3M no shortage of unsolved challenges. One of the biggest is simply EC's constantly shifting direction. Even the man at whom the infor-

Denny Sullivan: "EC is the most important enabler we have to drive process improvement."

mation superhighway road sign points acknowledges that. "There's no crystal ball. But it's clear that the electronic marketplace is going to replace some current ways of doing business," says Radford. Where the details are cloudy, Radford keeps the focus on 3M's business rather than on the uncertain fate of any particular EC technology. 

Staff Writer Derek Slater can be reached at dslater@cio.com. For more information on EC at 3M, visit CIO's Web site at www.cio.com/CIO/010197_3M.html.



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INTERVIEW: GEOFFREY A. MOORE

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Electronic COMMERCE

The winds of change are blowing through the EC industry, but no one can predict the outcome. Geoffrey Moore's technology adoption framework can help CIOs choose technologies that will still be standing when the gale dies down.

BY CAROL HILDEBRAND

If there's one thing Geoffrey Moore likes, it's a good violent metaphor. His first book, *Crossing the Chasm* (HarperCollins, 1991), posited that to achieve market success, technology companies must find some way of leaping over the chasm that lies between early market success with technology-buying visionaries and the mainstream acceptance of more pragmatic companies. (Just think of the obvious inference—all those unsuccessful leapers lying bloodied at the bottom of the abyss.)

With his new offering, *Inside the Tornado* (HarperCollins, 1995), Moore, who is founder and president of The Chasm Group, a consultancy in Palo Alto, Calif., ratchets up the violence factor as he further explores the market dynamics behind technology marketing. The tornado refers to the market maelstrom that engulfs a company after it crosses the chasm and hits the mainstream marketplace. Suddenly, the once-fringe player is struggling to adapt to the demands of the masses rather than those of its former smaller, more technically erudite customer base. And as if he hasn't already set up an obstacle

Reader ROI

CONSULTANT AND AUTHOR Geoffrey A. Moore, who studies the market dynamics of technology adoption, offers perspective on the changing EC market and its implications for CIOs. In this article, readers will

- Gain tips to make intelligent choices in electronic commerce technology
- Gain insights into the future of EC on the Net
- Get a big-picture view of how to implement online transaction strategies

The landscape of the technology adoption life cycle

The map divides up the landscape into six zones, which are characterized as follows:

1. **THE EARLY MARKET:** a time of great excitement when customers are technology enthusiasts and visionaries looking to be first to get on board with the new paradigm.
2. **THE CHASM:** a time of great despair, when the early market's interest wanes but the mainstream market is still not comfortable with the immaturity of the solutions available.
3. **THE BOWLING ALLEY:** a period of niche-based adoption in advance of the general marketplace, driven by compelling customer needs and the willingness of vendors to craft niche-specific whole products.
4. **THE TORNADO:** a period of mass-market adoption, when the general marketplace switches over to the new infrastructure paradigm.
5. **MAIN STREET:** a period of aftermarket development, when the base infrastructure has been deployed and the goal is to flesh out its potential.
6. **END OF LIFE:** a time that can come all too soon in high tech because of the semiconductor engine driving price/performance to unheard-of levels, enabling wholly new paradigms to come to market and supplant the leaders who themselves had only just arrived.



SOURCE: THE CHASM GROUP

course, Moore also throws in bowling alleys (see glossary and chart, above) and gorillas. CIOs who want to latch onto technology that will be around for the duration can use Moore's theory to analyze the gyrations of a particular market segment—electronic commerce (EC), for example.

There is, of course, no guarantee that a company will successfully traverse that obstacle course, no matter how slavishly it sticks to Moore's road map. There are too many rogue factors—from marketing gaffes to a buying public that's not ready for a certain technology—that further complicate this already tortured process. But Moore's technology adoption life cycle does provide an interesting framework over which to stretch a present-day market in order to try to divine future states from present status. Senior Writer Carol Hildebrand recently spoke with Moore about the electronic commerce market.

CIO: So where is the EC market in this life cycle? Is it leaping, "tornado-ing" or what?

Moore: Actually, the term "electronic commerce" needs to be defined a little further because different parts of it are in different stages. I divide EC into two segments—EDI and the Internet—because the two are at different points in the technology life cycle.

What's where?

Let's divide the life cycle into thirds. The first third,

where new, exciting technology is bought by early adopters, is dominated by professional services (for example, SAP customers paying \$4 in professional services for every dollar of software) because paradigms are still unsettled and it takes a lot of technical expertise, project management and business process reengineering to be successful. The middle third of the life cycle, where a technology is "tornado-ing" into mainstream acceptance by pragmatists (like many CIOs), is dominated by products rather than service. That's because to meet tornado demand, vendors strive for "replicable" standard configurations, and services simply cannot scale fast enough with enough reliability to meet demand.

The final third is dominated by transaction services, where systems are outsourced to an infrastructure provider and then "repurchased" on a transaction basis—phone calls, airline tickets, all the way to EDS-style facilities management.

Where does that leave EDI and the Internet?

First, EDI. According to the structure I just outlined, it's clear that electronic commerce wants to be a transaction services business. That's the game people want to play. Now—and this is key—transaction services markets want and need a mature underlying infrastructure to perform. Think of the phone system or the highway system and you'll see what I

mean. Proprietary EDI, in which companies build their own business-to-business online payment and disbursement systems, has mature technology, but it's too expensive to generalize into the mainstream. It's what we call "bowling alley forever," like what's happening to videoconferencing systems. [The term "bowling alley" refers to a period of niche-based adoption just before the main marketplace tornado.]

And what about electronic commerce on the Internet?

The Internet does not yet have a mature underlying technology for electronic commerce, so EC on the Net hasn't even crossed the chasm yet. But I also think that many EC vendors are going to make a mistake with electronic commerce on the Net.

How so?

First, you have to think about the difference in markets. EDI today mostly serves proprietary supply

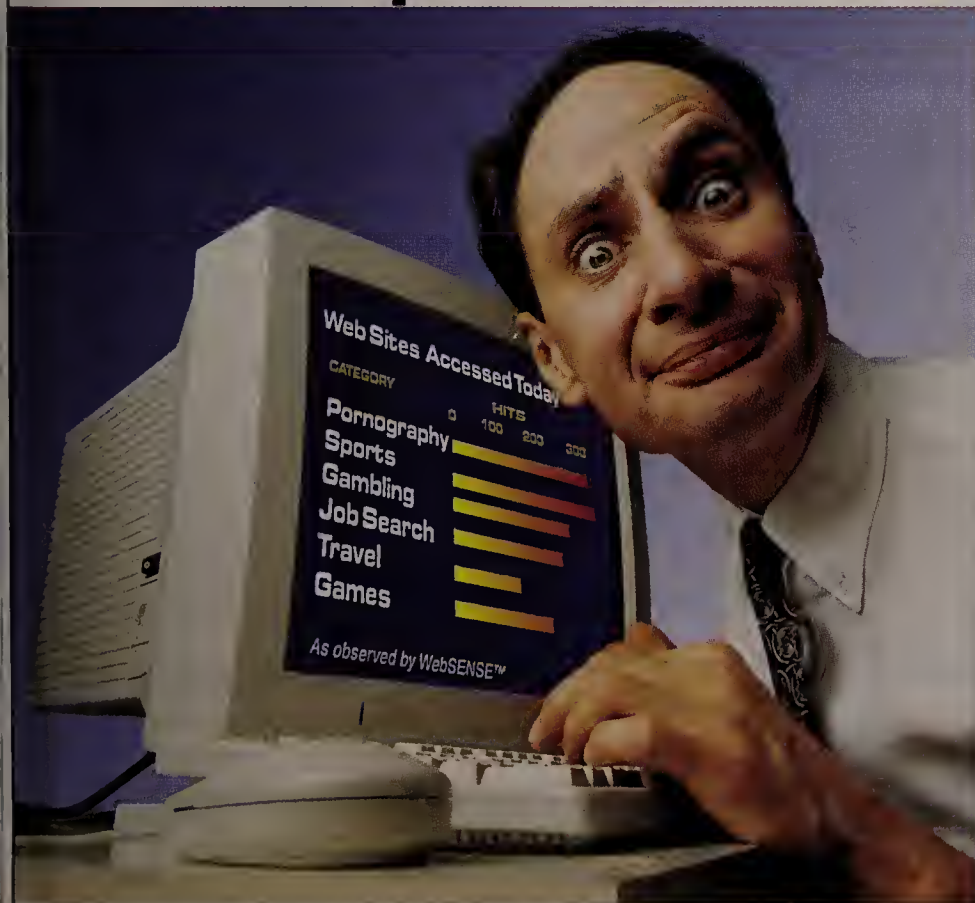
"The consumer demographics of the Web are still geeky. So unless you sell goods for geeks, you're probably OK being a little behind the curve."



chain relationships, while the Internet EC guys are trying either to go directly to "open" EDI on the Web, like Industry.Net, or go to consumers on the Web.

Since Web electronic commerce has not even crossed the chasm, a vendor should set up niche-

It's 5:00 pm



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specific franchises, which I think will be sustainable. If Industry.Net and others are doing authentic niche plays, then maybe nobody fails.

However, my experience is that few companies in early markets actually execute a niche strategy. Instead, they try to skip over the niche market development phase of the technology adoption life cycle and go straight into the mass market phase because that's where you can become the "gorilla," or the dominant vendor.

I believe they're going to fail because the market is too aware of the value of that end-game position, and the market will not allow any one vendor to get it. But vendors will still try this sort of preemptive market-share grab, even though it won't work. Here, though, they're going to lose money doing the grab, but they're not going to earn the prize at the end. Because no matter how hard they try to win, too many other vendors will stay in the game.

What are the implications for CIOs?

The key issue for a CIO, of course, is to not build an infrastructure where there is not a longtime franchise to sustain it. In the short term, this means building internal EDI projects rather than outsourcing them to a service provider. Only after the market shakes out will it be safe to outsource.

If Internet EC hasn't even crossed the chasm yet, what will it take to get mainstream acceptance?

On the retail side, the issue is access to consumers. And right now it's not quite so urgent, because the consumer demographics of the Web are still pretty geeky.

So unless you sell goods for geeks, you're probably OK being a little behind the curve. The problem is that when consumer EC does blow open, it's going to go like mad, and the last thing any company planning to engage in EC wants to do is be a year late to it, when the competition's already in.

What will drive the consumer stuff will be airline, hotel and car reservations, and then car purchasing, and then real estate browsing. Those are some fundamental personal transactions for which people are getting on the Web a lot more than you would expect. It's going to go beyond geeks very fast because they are already spending a lot of money in these areas.

On the nonconsumer side, what will happen to EDI on the Web? And what will it do to proprietary EDI?

Proprietary EDI is not going to go away, because there are industries heavily invested in it—niches of customers who were not served by the status quo and could not wait for a more mature solution. For example, the automobile industry is a big proponent of proprietary EDI systems, as is the retail industry. Companies really paid a price for their systems, and as a result market expansion is limited to the companies in enough "process pain" for it to be worth the financial outlay. I don't think customers necessarily got a bad deal with proprietary EDI. I just don't think they got as good a deal as open EDI. If a company's existing EDI systems work today with their most intimate customers, I would not expect them to change them. I would instead expect them to move out to the next level of intimacy until they find their first good Web opportunity and focus future EDI efforts there.

And what about EDI on the Web?

Open supply chain EDI vendors will be cheaper, but they'll still be able to get a healthy profit margin out of their customers—if they offer an industrial-strength infrastructure. Because, for example, you need to be able to prove accountability, certification, authentication and the like—as in, "You did too order that. I have your purchase order." So what you will start seeing are architectures in which there's an independent transaction brokering server between the customer and the vendor that is actually maintained by a third party.

All of that will take the existing EDI market into the open systems infrastructure, and it will be cheaper. Open EDI is going to be a really, really nice thing for business. And it's going to come. It's not going to come in a big rush next year. But it will come in a gradual, comfortable way. It will grow outward naturally.

What about all the failed open EDI vendors you mentioned?

They are the ones that will try to overaccelerate this process, getting ahead of the curve, putting in place an infrastructure at too great an expense too quickly and thus getting into a cash-flow crunch that will make them prey to surer-footed competition.

What does all this portend from a CIO's point of view?

I think CIOs will get better values each year. The key is to commit to the correct level of electronic commerce every year and not push beyond the envelope that current infrastructure and practitioners can support.

I would suggest that CIOs not invest in proprietary EDI if they haven't already done so. Instead, they can build a kind of concentric circle model of customer relationships and supplier relationships

"The notion that you're any less secure on the Internet than over a phone is baloney. The real issue is that people are trying to find things to throw in the way of having to adopt this change immediately."

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from most intimate at the center to least intimate at the periphery. Then, starting with the most intimate relationships, they should try an in-house, cooperative, point-to-point EDI project over this open systems infrastructure. And test it, obviously, with something that isn't mission critical. But then migrate it in toward mission-critical supply chain transactions.

CIOs have to get into this game now because there's too much business leverage at stake. EDI really does whack a hunk off time-to-market problems and administrative costs.

It's important to note that this is "open EDI" in the sense of using the Internet, but it is not yet an outsourced service. Until the industry as a whole shakes out, in-house projects will be the safer way to go. Of course, it would be great if those projects were compatible with the future standards, but the likelihood is that they won't. And yes, they will have to be reengineered to go into some future, standard, outsourced EDI. But to wait now would be a mistake.

One final question—What about security?

People are going to be desensitized to that issue very quickly. The notion that you're any less secure on the Internet than over a phone is baloney. Even on

the commercial side, where it is a very serious issue, if you look at the security issues and the people working on them, this is not a difficult problem. The real issue is that people are trying to find things to throw in the way of having to adopt this change immediately. Fundamentally, the strongest slowing effect by far is just the fact that people don't like to change. And so they use any reason they can find to study that change some more. Now we're just waiting for the pain of broken processes to overcome people's uncertainty and doubt. **CIO**

Senior Writer Carol Hildebrand can be reached at cjh@cio.com.



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Edited by Elaine M. Cummings

EC Payment Schemes

Commerce may be moving across networks into the next millennium, but payment methods are still lagging behind

BY ELAINE M. CUMMINGS

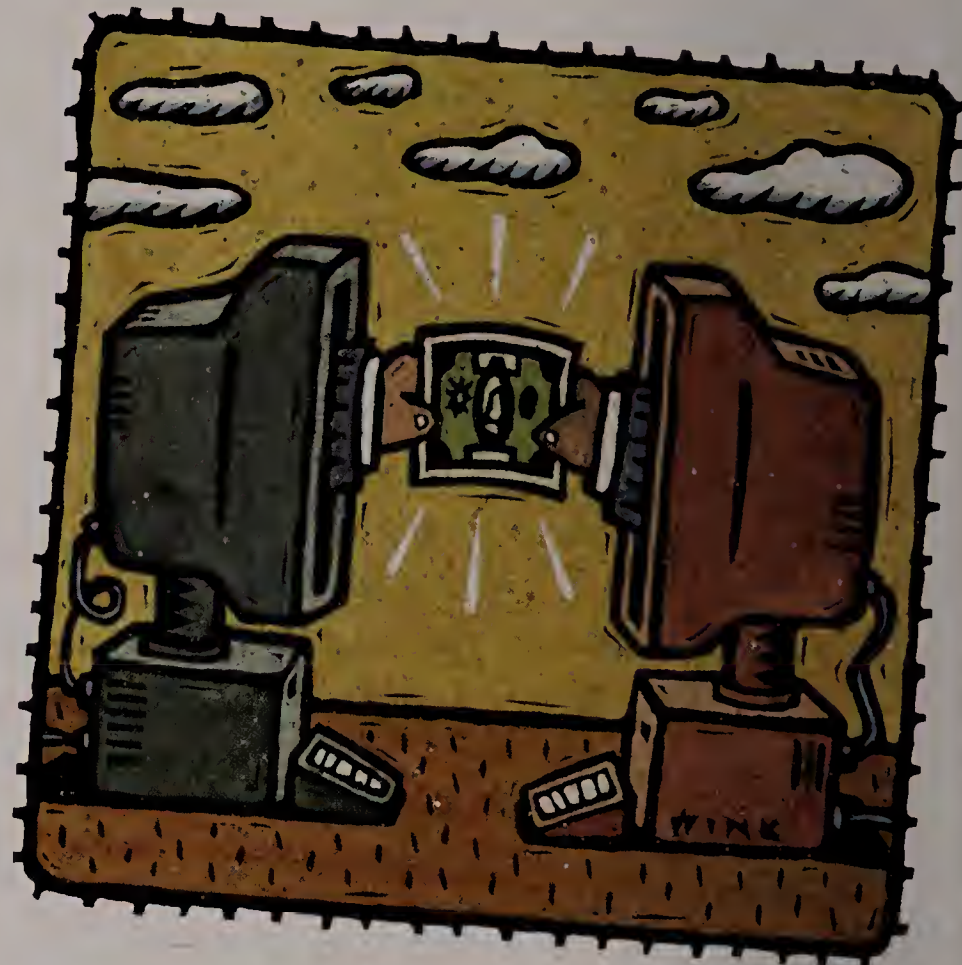
AS THE PIONEERS OF THE online era move with all the finesse and strategic planning of stampeding buffalo into the uncharted territory of electronic commerce (EC), the one concern they share is how to pass the buck. Literally. The PR newswires and trade press are flooded with announcements of new initiatives, new consortia and ringing new pronouncements about the changing business landscape.

Credit cards (Visa or MasterCard) or charge cards (American Express) have aided in growing retail spending since the late '40s. The Internet supported an estimated \$520 million in commerce last year, and it's expected to be at nearly \$6.5 billion by the year 2000, according to Forrester Research Inc. in Cambridge, Mass. Meanwhile, the boom in electronic data interchange (EDI) has leveled off some, but even it continues to grow by about 30 percent a year, says Linda Garvelink, senior director of marketing for the National Automated Clearing House Association in Herndon, Va.

Despite rosy predictions for the future of electronic commerce, today's reality is a little less pink. Choosing the right model for your business makes diving into EC

a challenging venture for any company. So-called "electronic payment systems" can include large-scale bank-to-bank electronic funds transfers or the familiar ATM transaction.

The rapid growth of online shopping and such offerings as movies-on-demand, interactive ads and home banking are spawning new models for currency exchange. Today's electronic payment schemes—either



token-based electronic cash or checks, smart cards or encrypted credit cards—are proliferating faster than department store Santas at Christmas.

One model for those kinds of payments comes from the credit cards consumers use to make purchases by mail and telephone. Not surprising, credit card companies expect to play a major role in the future of online payments as well. "I think the MasterCard and Visa models will probably work pretty well in general," says David Weisman, director of money and technology strategies at Forrester Research. "Credit cards are protected by regulations, and consumers are used to using them over the phone and by mail. There are a lot of incentives to use credit cards over the Internet."

But there is also one big disincentive: security—or, more accurately, insecurity. Despite a fairly good track record in that area, the Internet is still perceived as being too insecure for credit card purchases. One of the major sources of loss for credit card companies is merchant fraud, where a merchant obtains credit card numbers in legitimate transactions and uses them to make charges to customers' accounts.

IN THIS SECTION

EC Partnerships

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MasterCard and Visa are pushing the Secure Electronic Transaction (SET) protocol for credit card transactions over the Net. SET enables the secure exchange of information—from consumer to merchant to bank and back again so that consumers can charge items to a credit card without showing anyone the number. Under such payment schemes, merchant fraud is virtually impossible. The information arrives at the merchant site encrypted—the number hidden from unscrupulous merchants or employees—and it isn't decrypted until it reaches the credit card company or its agent. The credit card company then issues the authorization, and the purchase proceeds.

"The first phase is for merchants to use SET when they get credit card authorizations by phone," says Torrey Byles, industry analyst at Giga Information Group, a Cambridge, Mass., consulting firm. "That's a link between the Web site, which is the storefront, and the acquiring bank." The second phase is for SET to enable customer communication with the merchant, actually sending the credit card information. "That's probably not going to happen until the beginning of next year," says Byles.

Nevertheless, if companies expect consumers to embrace online commerce as they did the local ATM, they will have to find solutions that render electronic payments as secure and convenient as any other means of payment. Companies expecting to conduct banking and other financial transactions over the Net will need to focus on confidentiality and data integrity so that customers and businesses alike can be assured that the data remains private and unmodified during transport.

Pretty Good Security

The fundamental problem with Internet security is that TCP/IP, the standard Internet communications protocol, was not designed with security in mind.

The Beginning of a Beautiful Friendship

IBM joins major banks in developing electronic commerce projects



WHERE DOES A 600-pound gorilla sit? Anywhere it wants to, especially if it happens to go by the name of IBM Corp.

In October 1996, IBM and 15 major banks announced a partnership to form Integrion Financial Network, a for-profit endeavor to develop electronic banking systems and software for electronic commerce through the banks. Owned and operated jointly by IBM and the banks, Integrion plans to develop open standards for banking tasks, such as transferring funds, and make application programming interfaces (APIs) available to soft-

ware companies for paying bills securely. In announcing the new company, IBM Chairman and CEO Lou Gerstner promised that the APIs will be available free to software vendors.

"The partnership will enable banks to play a central role in determining the manner and format in

EC PARTNERSHIPS

which these [electronic commerce] services are offered [to the banks' customers]," says one company partner.

That's important for IBM, which is building a strategy around the Internet. But it is even more important for the banks. Many of the electronic payment plans being developed today either don't involve banks or reduce them to bit players. The banks must develop bank-centered electronic commerce for retail customers or risk losing them.

The Integrion member banks include BankAmerica Corp., Banc One Corp., First Bank Systems and NationsBank Corp., and serve half the retail banking population in North America. By banding together, the banks share costs and gain market presence. By teaming with IBM, they get a Big Blue gorilla in their corner.

—Rick Cook

TCP/IP calls for the individual packets that make up each Internet message to be partially read by the many intermediate nodes between the sender and the receiver. A system designed with many intermediate nodes is vulnerable to a security breach; as with any secret, the more people who know it, the less secure it is. But it's easy to encrypt an Internet message, scrambling the information into a form unreadable by anyone

except those with an encryption key. Some of the methods, such as PGP, an RSA-based de facto standard for e-mail encryption that stands for Pretty Good Privacy, are virtually immune from eavesdropping. Secret-key encryption, implemented with the DES standard, uses a shared key for encryption by the buyer and for decryption by the seller. Because it relies on sharing, it does not scale securely and is unacceptable for

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most forms of electronic commerce. Public-key, or double-blind, encryption uses first an RSA-based private key to encrypt data transmitted by the buyer and then a public key to decrypt information received by the seller.

Buyers and sellers can use double-blind encryption to create "digital signatures," the equivalent of handwritten signatures that provide a similar function of identifying a user. In creating a digital signature, public-key cryptography systems, such as PGP, generate messages that automatically identify the users and ensure nonrepudiation, guaranteeing that any person who signs cannot renege on the deal.

The thorniest aspect of creating an effective public-key system is assuring the authenticity of the parties involved. One solution is finding a trusted third party to authenticate and certify electronic identities of companies and individuals. Seeing a lucrative opportunity, not a few organizations—among them IBM Corp. and the U.S. Postal Service—have offered themselves as trusted third parties.

IBM has also devised Cryptolope containers based on a security-rich packaging technology that addresses the problems of how to transport electronic commodities such as music, film, art or software securely over networks and to how to pay for their use. Each container holds an encrypted version of a text document and an attachment to the file that describes its contents and spells out the terms and the price for accessing those contents. If the user agrees to the terms and price, he or she can register online, receive a key and open the Cryptolope container. IBM's billing system will automatically bill and take payment from the user and remit payment to the contents' owners.

Micropayment Mechanisms

In addition to encrypted credit cards, which are suitable for large-scale transactions, online sellers must also consider new electronic mechanisms that can function as digital cash for transactions that are too small to be handled efficiently by credit cards. These token-based versions of electronic cash, or e-cash, can be in the form of debit cards or electronic checks and must also be secure, low cost and acceptable worldwide. They can be backed by cash or bank-authorized credit, are exchangeable for cash, goods, services or deposits, and are stored or retrieved remotely from home, the office or while traveling. The consumer establishes an account at a participating bank and supplies that account with enough money to back his or her purchases. After making a purchase at any shop accepting e-cash, the consumer's PC stores the remainder. The merchant can check the veracity of the digital signature by using the bank's public key, deposit the e-cash in his or her machine and then later deposit it in the bank.

Electronic checks work in much the same way as conventional checks, bearing the electronic equivalent of a signature and requiring the endorsement of the payee before cashing. Conventional cryptography makes e-cash well-suited for payments too small to be handled by credit cards. Although most are still in the design phase, several systems are being devel-

LEADING

EDGE

Putting IT in T-E-A-M

THERE IS NO "I" IN "TEAM," the saying goes, but Scopus Technology Inc. aims to put IT in teamwork. **QualityTeam**, an enterprisewide product life-cycle management application developed by Scopus, allows users to manage the product development process by amassing in one place data from such diverse business areas as quality assurance, sales and marketing, engineering and customer support. Designed for distributed, client/server environments, QualityTeam tracks that data so that users can pinpoint flaws in the production process and improve their time to market by correcting those glitches. Also, by documenting the development procedures required to meet ISO 9000 standards, QualityTeam can help reduce the time needed to file for certification.

The key data measured by QualityTeam are deliverables, defects, change requests, change proposals and trend analyses. From that data, users can monitor product development, document when production milestones are reached and improve success at predicting product quality and release dates. The application also improves interdepartmental communication, and it integrates customer input to help align products with specific customer needs. One of QualityTeam's unique features is a Process Detail Control that, like a dial on a radio, allows users to "tune" the application to increase or decrease the level of sophistication required by existing business practices.

QualityTeam is a standards-based application designed to run on all major computing platforms. The system is priced at \$2,975 per user, with a tiered server charge starting at \$12,000 for five users. For more information, call Scopus at 888 200-2971, or visit the Scopus Web site at www.scopus.com.

oped to deal with such transactions. Many of the systems, such as Digital Equipment Corp.'s Millicent and the proposed Netbill protocol, are designed for companies selling information or small software programs over the Net. Almost all of the schemes depend on a third party to verify that the buyer has the money available and that the seller has delivered the goods before releasing payment. Because the process is so highly automated, it can be cost-effective on transactions down to a fraction of a cent.

CyberCash Inc. in Reston, Va., has a new payment service called CyberCoin, which enables individuals to make elec-

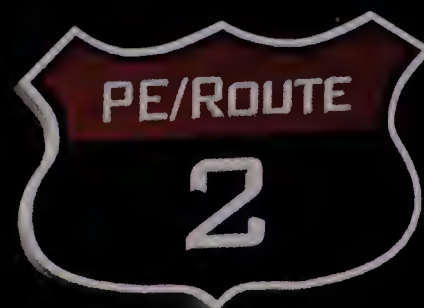


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Emerging Technology

tronic cash transactions costing anywhere from 25 cents to \$10. "Internet merchants must offer consumers the ability to make spontaneous, small-denomination payments on the Internet to take electronic commerce to the next level," says Bill Melton, president and CEO of CyberCash. CyberCoin can be used with any existing bank account or major credit card—all that is needed is an Internet "Wallet," which is free to consumers and can be downloaded from the CyberCash Web site (www.cybercash.com).

If the growth of token-based payment schemes is stunted due to a lack of acceptance, smart cards will likely emerge as the candidate for the future currency. A smart card is essentially a credit or debit card with an embedded chip that holds much more information than the traditional magnetic strip.

Relationship-based smart cards are like credit cards with additional features such as value-added marketing programs and access to multiple financial accounts. Electronic "purses," more like debit cards, receive money from an ATM or through special phones and can be "recharged" once they become depleted. Their success depends on how ubiquitous smart-card readers become in places such as vending machines and tollbooths.

However, not everyone is convinced that the microcommerce market will support special protocols or payment systems. Forrester's Weisman is among the skeptics. "I'm not a big believer that these digital things will take off," he says. "They are not protected like credit cards nor are they issued by trusted brand names." Instead, he sees microcommerce being folded into the larger retail transaction business, especially credit cards. "Not many businesses can make a solid business case for nickels and dimes, and a lot of them are going to want to go to aggregate transactions," he says. "People will be more comfortable with something issued by a bank that they can use both on and off the Internet."

But not everyone agrees. Stephen D. Crocker, senior vice president of development for CyberCash, says that when the item being purchased is inexpensive, the risk to the customer and merchant is low, which translates into a low transaction cost. E-cash is not subject to the same regulations that protect consumers against credit card fraud but at the same time drive up costs. "Microcommerce mechanisms won't work if you try to burden small payments with regulation costs," Crocker says. **CIO**

Associate Editor Elaine M. Cummings can be reached at cummings@cio.com. Additional reporting by freelance writer Rick Cook.

LEADING

EDGE

Windows Unplugged

IT CONNECTS THE BEST OF BOTH WORLDS, with nary a wire between them. The **Stylistic 1000 RF**, a wireless Windows 95 tablet PC from Fujitsu Personal Systems Inc., uses radio technology from Proxim Inc. to offer mobile users full access to their stationary databases.

The Stylistic 1000 RF packs the power of a desktop computer into a tablet that weighs 3.6 pounds and measures 7.3 x 11 x 1.6 inches and includes Proxim's built-in 2.4GHz wireless LAN radio system. With this computer, mobile users can have all the IT comforts of the LAN at their fingertips when they are at work out on the floor. For example, hospital

clinicians can link directly to hospital databases when they treat patients, and trading managers can access real-time worldwide market data direct from a central server.

The color tablet PC is powered by a 100MHz 486 processor with 8MB of dynamic RAM that can be expanded to 40MB. It is compatible with Novell Inc.'s NetWare and Personal NetWare and TCP/IP protocols.

The radio system is Proxim's RangeLAN2, featuring 15 independent channels, a 1.6Mbps data transfer rate and a 200- to 500-foot indoor wireless range to an Ethernet access point.

The Fujitsu Stylistic 1000 RF is priced beginning at \$4,185. For more information, call 800 831-3183 or visit Fujitsu's Web site at www.fpsi.fujitsu.com.



Patently Obvious

WHOEVER THINKS PATENTS SHOULD REMAIN buried deep within the files of a corporate legal department is in dire need of a wake-up call. So contends Kevin G. Rivette, former patent attorney and current president of SmartPatents Inc., a Mountain View, Calif., provider of analytical software tools designed to help companies manage their intellectual property assets.

To help manage patents and keep an eye on what your competition is up to, Rivette's company offers **SmartPatent Workbench**, a Windows-based analysis tool that allows companies to quickly organize patents from a customized library that's updated regularly. Using the SmartPatent Workbench, users can search for patents in seconds, view hyperlinked text and images, annotate patents and create maps comparing company patents with those of competitors. System requirements for SmartPatent Workbench include a 486-based PC, at least 8MB of RAM and Microsoft Windows 3.1 or DOS 5.0 or higher. Pricing depends on the licensing agreements and the customized libraries. For more information, call 415 237-0900.



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New Microsoft Team Manager 97

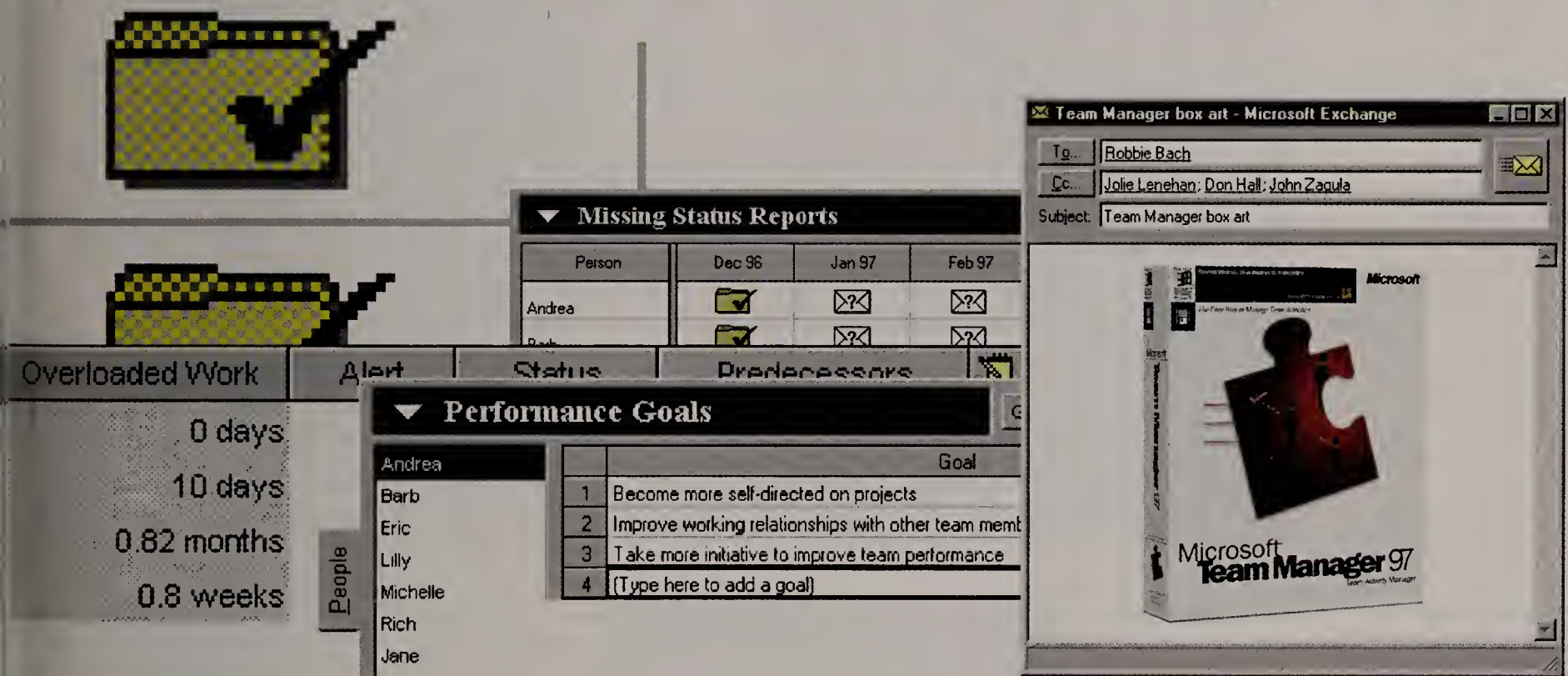
***is the kind of manager you'd be
an additional 16***

The screenshot displays the Microsoft Team Manager 97 interface. At the top, the 'Task Organizer' window is open, showing a list of tasks with columns for Task Name, People Assigned, Total Work, Deadline, and Priority. Below this, the 'Tasks that Need Attention' panel is visible, featuring a 'Vital Signs' sidebar on the left with options like 'Tasks with Deadlines', 'Tasks that Need Attention' (checked), 'Tasks with Unassigned Work', and 'Missing Status Reports'. The main area of this panel shows a list of tasks with red warning icons, including 'Finish first quarter projections', 'Prepare presentation for Fall sales', 'Revise current client database', and 'Develop agenda for Team retreat'. The interface also includes a calendar for March 1997 and a 'Send Updates...' button.

Task Name	People Assigned	Total Work	Deadline	Priority
Write product name summary	Lilly, Eric	2 weeks		Highest
Competitor pricing research	Jane	6 weeks		

Task Name
12 Finish first quarter projections
14 Prepare presentation for Fall sales
18 Revise current client database
19 Develop agenda for Team retreat

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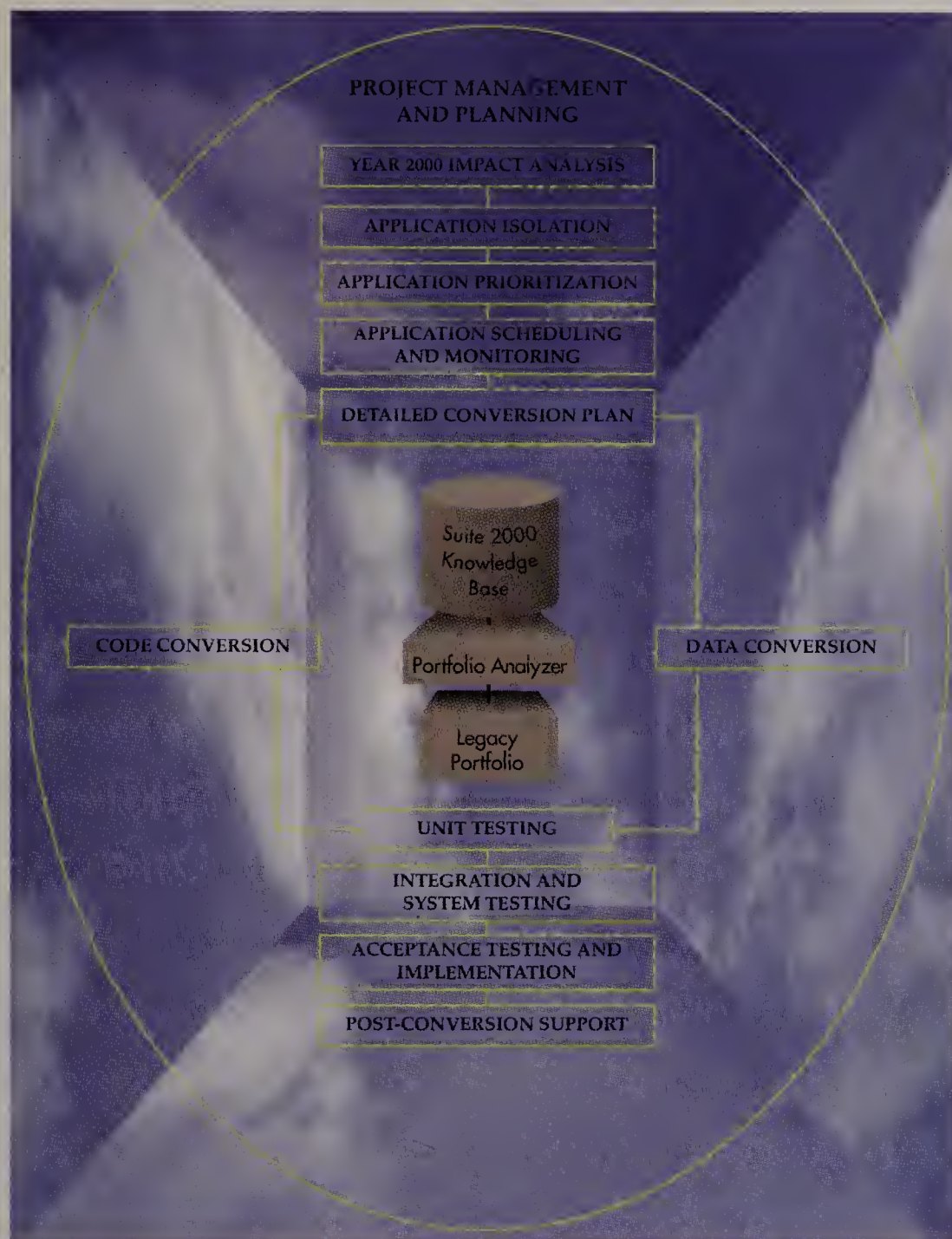
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ShopTalk

Encyclopaedia Britannica's Larry Merrick on Launching an Internet Product

Why did Encyclopaedia Britannica, a 228-year-old company steeped in leather-and-mahogany tradition, decide to do business on the Web?

The traditional business environment had been tough for some time. Inexpensive CD-ROM encyclopedias made our product a commodity. Market demand for information retrieval and distribution was shifting to wide area networks, and we wanted a way to propagate and maintain our database [of encyclopedia articles] at multiple, networked customer sites. The Web was the easiest way to do that.

What do you tell people who scoff at the idea of making money on the Internet?

Our purpose for being on the Internet is clear: We needed to do it. Companies that put the Web down as hype may not know what their purpose is for being on it.

Colleges and universities pay to subscribe to Britannica Online based on their number of full-time student equivalents—from \$2,500 for 2,500 or fewer students to \$353,500-plus for larger

universities. Contrast that with book sales: A university might buy one new set a year [at a discounted price of \$595]. There's no comparison. We *are* making money on the Web.

How did you deal with security?

Security is something you have to take seriously; but the tools are available. Our encyclopedia articles are our family jewels, and we can't let them be stolen. We've adequately addressed them with commercially available firewalls plus add-on software we wrote that keeps track of how many Britannica Online URLs a customer site accesses per day. If we suddenly see a spike, it could mean someone is trying to illegally download the product, and we shut them off.

Have your challenges changed as a result of Web commerce?

I now explain the Internet's technology environment to executives. It's painful at times. My favorite question is, "How do we track how long a person is on Britannica Online?" I try to explain that the Internet isn't time based; it's transaction based.

I also have to think like a security guard now. I find myself thinking, "If someone were to break into our system, what would they do?" Though we've addressed security issues, it's never

over. It's like an arms race. I find myself wondering what we can do next to anticipate what they'll do next.

What effect has the launch had on your systems and infrastructure?

Capacity planning is difficult. The Internet is like a highway: At rush hour it is bumper to bumper, but at 2 a.m. you can do 75 miles per hour. My offramp may be fine, but if the Internet's slow, people blame us.

A different challenge is keeping the Internet systems running. When we do have outages, it's mainly hardware problems—a server or disk drive. Fault tolerance is an ongoing challenge. Since I have to manage the company's IS funds, I have to look

for the [fault-tolerant] technology price curve to come down and buy when it makes sense.

Where are you taking Britannica Online next?

For the first time, we have a way to see what people look up in an encyclopedia. We're trying to capture those hits at a high level. We also want to look at queries where there were no hits. From an editorial standpoint,



Spotlight On:

Larry Merrick, vice president of information technology, Encyclopaedia Britannica Inc., Chicago

- **Line of Business** Regular-bound volume encyclopedia and a Web-based version, Britannica Online, that is sold by subscription
- **Bio** Joined Encyclopaedia Britannica in 1989 as executive director of MIS; was director of applications development at publisher Scott Foresman
- **Day to Day** Oversees IS, applications development and LAN issues; focuses on product planning and systems support for Britannica Online
- **Challenges** Planning for network capacity needs and supporting the less-sophisticated individual consumer market

that information is phenomenally helpful in updating the encyclopedia and addressing what people want to see that we don't have.

—Richard Pastore



fig. 1



fig. 2



repeat vigorously

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CapitalOneSM

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